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CONTENTS

ORIGINAL ARTICLES.

Tubal and Ovarian Infection. J. W. Kennedy, Philadelphia, Pa. ...241

The Etiology of Pyosalpinx—History—Prophylactic Treatment—Method of Making Diagnosis—Vaginal Puncture — Its Shortcomings—A Description of the Author's Technic of an Operation for Tubal and Ovarian Suppuration—Drainage—Mortality.

Brain Injuries. B. F. Zimmerman, Louisville, Ky. 254

Anatomical and Physiological Observations—Clinical Observations—Focal Symptoms—Treatment, Surgical and Otherwise—Conclusions.

Deformities of the Nasal Septum. Their Correction by an Improved Technic for Submucous Resection. J. S. Maybaum, New York. ...260

Indications for Performing Submucous Resection—Classification of Septal Deformities—Pre-operative Preliminaries—Anesthesia—Author's Operation—Summary.

Notes on Minor Eye Injuries. John R. Wright, Louisville, Ky. 262

Methods of Treatment Which Gives the Best Results—The Local Anesthetic—Injuries to the Conjunctiva—Foreign Bodies—Lime Burns.

Carbohydrate Feeding in Surgical Cases. Andrew McQueeney, Bridgeport, Conn. 264

Statistical Statements—Reasons for Post-operative Gastric Distress—Acetonuria—The Author's Post-operative Results from Feeding Method.

The Injection of Methylene Blue to Facilitate the Surgical Treatment of Chronic Dacryocystitis. John Guttman, New York City. 265

The Operation for Stenosis of the Tear Passages—Reasons for its Unpopularity—Difficulties in Differentiating the Walls of the Lacrimal Sac—The Author's Method of Overcoming this Difficulty.

A Prosthetic Appliance Devised and Constructed by Dr. J. Porter Micheals of Paris to Replace a Necrosed Shoulder Joint, Removed by Dr. Péan. E. A. Bogue, New York. 266

History of the Case—The Construction of the Apparatus—The Usefulness of this Ingenious Contrivance.

EDITORIALS.

The Organization of Medical Preparedness. 268

The National Board of Medical Examiners. 269

Sir Victor Horsley. 269

SURGICAL SUGGESTIONS....270

SURGICAL SOCIOLOGY.....270

BOOK REVIEWS.

Gynecology—Graves. The International Medical Annual. Lateral Curvature of the Spine and Round Shoulders—Lovett. 272

Traité de Gynécologie—Forgue et Massabuau. The Kinetic Drive—Crile. Diseases of the Skin—Sutton. The Catarrhal and Suppurative Diseases of the Accessory Sinuses—Skillern 273

PROGRESS IN SURGERY.

A RÉSUMÉ OF RECENT LITERATURE.

Syphilis in Obstetrics 273

Carcinoma Uteri. Acidosis in Pregnancy. Labor following Ventral Suspension. Uterine Prolapse an Cystocele. Subluxation of the Radial Head. Fracture of the os Calcis. 274

Tuberculosis of the Superior Maxilla. Infection of the Mastoid Bone. Sarcoma of the Scapula. Septic Joints. Gas Gangrene. Roentgen Diagnosis of Gas and Pus Infection. Gamma Rays in Deep-seated Cancers of the Pelvis. Pelvic Varicocele. Excision vs. Gastro-Enterostomy. 275

Exophthalmic Goiter. Brain Injuries. Mayer's Solution. Tubal Sterilization. 276

MISCELLANY.

Tuberculosis of the Kidney.....265

Fracture of the Internal Condyle of the Humerus. 267

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VOL. XXX. AUGUST, 1916. No. 8.

TUBAL AND OVARIAN INFECTION.

J. W. KENNEDY, M.D., F.A.C.S.,
PHILADELPHIA.
From the Clinic of the Joseph Price Hospital.

I discuss this subject under the one head, as I feel the two lesions are, from a surgical standpoint, inseparable.

I always treat inflammatory lesions of the tubes and ovaries as a pathological entity. For a classical discussion of the subject, from salpingitis to pyosalpinx, or from ovaritis to ovarian abscess, I advise the reader to consult any modern text book. For any author in America to discuss inflammatory suppurative lesions of the uterine appendages without generous references to the work of Dr. Joseph Price, is to display unfamiliarity with the subject. It can be said, without possibility of denial, in my opinion, that the late Joseph Price had no peer as a surgeon in dealing with tubal and ovarian suppuration. I have seen a great number of cases which were entirely inoperable in the hands of excellent surgeons, cases which had been abandoned in operative procedure, which were completed with great ease and dispatch by Dr. Price, even though the operation was infinitely more difficult as a secondary one.

I make this reference to his great skill in this line of work, because it will later bring up a difference of opinion concerning removal or treatment of tubal and ovarian suppuration; one operator advocating radical removal of pyosalpinx and ovarian abscess, others dealing less radically with them, not so much on account of any good surgical reason, but possibly on account of the difficult surgery involved in the more radical procedure. What I say about pyosalpinx will also relate to ovarian abscess.

Regarding the etiology of pyosalpinx, it has been my experience in 95 per cent. of the patients upon whom I have operated that there had been some previous history with possible gonorrheal infection. I could not confirm such statement by microscopical examination, even though an exhaustive study had been made of each case, as by the time the patient presented herself for operation, it would have been impossible to find the specific germ. I have come to such conclusion from a clinical study of these patients and have based my observation on a definite previous history of yellow discharge, dysuria, frequency of urination and probability of infection. One may not be able to get such history previous to operation, but if one will carefully requestion the patient after operation and ask her when she had such symptoms, and not whether or not she had them, he will invariably elicit such a history. Then again, the nature of the pathology revealed at the time of operation, is diagnostic as to its etiology.

There is no infection which so uniformly leads to the big classical pyosalpinx, as gonorrheal infection. This is conversely confirmed by a familiarity with tubal disease of other known origins, such as the puerperal infection, which has little tendency to tubal occlusion, with formation of the classical tubal abscess. The symptomatology of pyosalpinx is most difficult to teach, as there is little consistency in its signs or symptoms. In the early stages of salpingitis of gonorrheal origin there is, as a rule, a clear history of pelvis pain, and great tenderness upon palpation of the vaginal fornix or the lower abdominal wall. Tenderness in the hypogastric region means some extension of infection or beginning peritonitis and is a little later in occurrence than the vaginal tenderness.

In nearly all cases of gonorrheal infection, there is a history of yellow discharge, sufficient to stain the clothes of the patient, an irritating dysuria, frequency of urination, swelling and tenderness of the vaginal and labial tissues. The swelling and tenderness of the vaginal tissue is, as a rule, of short duration, as the histology of the vaginal mucous membrane is such as not to harbor infection for any great length of time, so this condition cannot be treated as a vaginitis, with the idea that applications of antiseptics to the mucous membrane of the vagina will be of much benefit. The discharge is kept up by and through the infection of the urethra and the cervical mucous membrane, whose histology is more favorable to deep infection, so that the prolonged gonorrheal discharge is not, in a sense, from a vaginitis and should not be treated as such. In women the urethra is shorter and of greater diameter than in men and, therefore, better drained; but the infection is often of chronic duration and

of great virulence. It is my opinion that the cervix is often a nidus of gonorrheal infection and when this is ingrafted upon an old erosion, there is a chronically infected surface of extreme tenderness and a source of danger of further infection and also a means of exciting an acute exacerbation of the old trouble through any extra traumatic cause; therefore, in vaginal infection of gonorrheal origin, let us not think of the condition as a virulent vaginitis but direct our attention toward the prevention of the uretheral and cervical infection, anticipating the later resultant cystitis or tubal and ovarian infection. The vaginal discharge is of little pathological importance from a surgical standpoint other than as an occasional infection of Bartholin's glands with resultant abscess.

In regard to the prophylactic treatment of salpingitis or pyosalpinx of gonorrheal origin, I do not know of how much real service we render through local treatment of a specific vaginitis, urethritis or cervicitis; I have never had much confidence in local antiseptic and germicidal remedies in any of these conditions. I have always felt that the trauma incident to their application, on account of the inaccessibility of the true source of infection, was a means of further infecting the patient; however, other observers reported some supposed good results from local applications to the urethra and cervix. If there is any such thing as a prophylactic treatment of tubal and ovarian infection, I believe the best results can be obtained by putting the patient in bed on a light diet with frequent purgation.

Prolonged douches of hot astringent antiseptics may be of benefit, if they are carefully given, the patient being in the recumbent position. Great care must be used in the douche in order to prevent all trauma. All sexual excitement must be prevented. I feel that the usefulness of local applications in these cases is so very limited, that I have absolutely no office treatment along these lines. It matters not what the treatment may be, a very large per cent. of gonorrheal infections goes on to tubal and ovarian complication. It is with the surgery of this tubal and ovarian infection that I want to deal.

I am frequently asked if I believe that all cases of early gonorrheal infection of the tubes are surgical. In a broad sense they are. A certain per cent. of these cases of salpingitis may early become quiescent and may not give the patient annoyance until later years.

If the salpingitis has been of sufficient virulence to cause occlusion of the fimbriated extremity of the tube, I question whether these patients are ever free from the probable need of surgery. It must be borne in mind that gonorrheal infection is a destructive inflammation of the mucous membranes with a tendency to burrow deeply into this structure. I have always felt that if the infection from the gonococcus were as destructive to serous as to mucous membranes, we would lose a large per cent. of our cases of gonorrheal salpingitis from a diffuse peritonitis and its complications.

Fortunately, as this infection reaches the fimbriated extremity of the Fallopian tube and begins to infect or irritate its endothelial or peritoneal covering at its extremity, the reaction of the peritoneum is such as to occlude and limit the infection to the confines of the tube with a resulting tubal abscess. In those cases in which the ovary is also destroyed and the condition is one of tubo-ovarian abscess, the infected tube has, as it were, grasped the ovary with its infected fimbriated extremity, resulting in infection and destruction of the ovary. The ovary thus held in bondage, in the grasp of the infected tube, evidently soon loses its peritoneal covering from the destructive inflammation and the organ is thus sacrificed.

I have noticed in those gonorrheal infections in which the tube became of gigantic size from distension with pus and was not in a sense grasping or directly related to the ovary, that the ovary was in many instances in a state of preservation; at least it had not been destroyed. I use the phrase "state of preservation" in a qualified sense, as it is my opinion that practically all such ovaries are infected and should be treated surgically as such.

I believe the manner of infecting the Fallopian tube is clear, or at least satisfying, in that we feel the infection extends from the uterus by process of continuity of mucous membrane into the tube. In regard to the manner of ovarian infection, from my observations, I feel that in a certain per cent. of cases the ovary becomes directly infected through its blood and lymph supply. I give as my reasons for such conclusion, the following surgical experiences:

I have operated upon a great number of patients from whom I have removed a large ovarian abscess, as big as an orange or grapefruit, and did not use a ligature. The ovarian abscess could be shelled out with great ease.

Its attachment or surgical neck through which its vessels came, seemed to be rotted off and the lumen of the vessels occluded. From the facts that the tubes seem to have no direct relation with this form of ovarian abscess and that it could be removed without ligature or hemorrhage, I came to the con-

clusion that its infection came by way of its circulation through its mesentery. Further, the ease with which this big ovarian abscess can be removed indicates that its source of infection is in a sense internal through its circulation, because if the infection had extended from the tube on to the peritoneal surface of the ovary, the adhesions would have been universal, making its removal a difficult one.

Again, the very nature of the abscess suggests internal infection from its circulation, as the destruction of the ovary is complete, as it would probably be from a deep-seated, internal infection. The thickening of the walls of this abscess probably come from a piling up of one layer of adventitious or inflammatory membrane upon the other, which are the products of different attacks of local peritonitis. On account of this frequent internal infection of the ovary I have felt it is necessary in dealing with gonorrheal salpingitis or pyosalpinx to anticipate that the ovary is already infected and deal with it accordingly. My surgical experience with a great number of re-operations done on those patients who have had incomplete removal of the uterine appendages, forcibly bear me out in my opinion that tubal and ovarian infection must be treated as a pathological entity. This is entirely in accord with the teaching of Dr. Price, whose enormous experience in this subject makes most that he has said axiomatic. Every now and then some author comes forth with a paper advocating conservative treatment of infected tubes and ovaries and reports a pregnancy following a conservative operation on the uterine appendages. We all have seen this, but how many deaths have come from such incomplete work? How many of these patients who have had incomplete surgery on the uterine appendages, later develop almost impossible surgical procedures, the most difficult operations in abdominal surgery.

The diagnosis of tubal and ovarian infection of gonorrheal origin must be largely by palpation or physical signs.

It is most remarkable how very comfortable a patient may be and yet have an almost inoperable consolidation of her pelvic viscera. I have seen practically the lower half of the abdominal cavity, indeed, from the umbilicus to the coccyx, an incarcerated mass, yet the patient was fairly free from pain.

I believe that text-books in giving menorrhagia and metrorrhagia as a frequent symptom of tubal and ovarian infection, are to be questioned. I often find a normal menstrual life in even those exaggerated cases of tubal and ovarian infection. Fever is not often found except in the early stages of the condition, or later in the disease where there has been some acute exacerbation of an old condition. Pain upon locomotion is worthy of consideration. Most of the patients with tubal infection are careful in their movements; they avoid all jars and jolts; indeed their careful step and stooped position is often diagnostic as they enter the dispensary.

It is impossible to teach palpation upon paper. No operator has a right to do pelvic surgery unless he has had a long gynecological touch course. One of my assistants said, after making several thousand bimanual examinations in the old Philadelphia Dispensary, that he had not yet felt an ovary. So skill in pelvic examinations can be acquired only through prolonged training in a gynecological dispensary. It is almost impossible to convey to a reader's mind just what is meant by a mass in the lateral vaginal fornix, or what might be considered tenderness incident to tubal or ovarian infection. In a large per cent. of cases of tubal and ovarian fixation, a mass is easily palpated, but in a certain per cent. the tubes are fixed at a high level quite out of the pelvis, so that no mass is felt from vaginal palpation and little tenderness. There is some tenderness of the cervix, but the lateral mass incident to pus tubes, is more sensitive than the cervix; the reverse is so in extra-uterine pregnancy. I shall discuss this differential point at length when I take up extra-uterine pregnancy, as it is most worthy of consideration.

If one is familiar with the freedom of motion of the normal pelvic viscera, then fixation of the uterus and appendages is of extra value in the recognition of tubal and ovarian infection.

In taking up the surgical consideration of tubal and ovarian suppuration or any lesser degree of destruction of the uterine appendages, I believe the opinions of operators will differ in due proportion to their ability to deal surgically with the condition. The removal of the old suppurative condition of the tubes and ovaries from gonorrheal infection, is among the most difficult of all abdominal operations; therefore, one who has not had a long apprenticeship in pelvic surgery, or one who has not been taught the importance of radical removal of the fixed appendages, would be influenced toward the more conservative and less brilliant surgery and adopt vaginal puncture in a large number of cases. I am sure no one could have had an apprenticeship under Dr. Price and not have positive convictions regarding the necessity of radical removal from above of all suppurative lesions of the uterine ap-

pendages of gonorrheal origin. If conservative work has been practiced and vaginal puncture done in these conditions, secondary operation is infinitely more difficult, for each puncture is as a steel rivet nailing the pathology to the pelvic wall. If, as the vaginal puncture advocate claims, some patients are so acutely ill that they would not have stood radical operation from above, I have never seen such patients and my experience in this class of patients goes into the thousands. If a patient is too ill to stand a radical removal of the uterine appendages from above, I am quite sure vaginal puncture would not save her life. I base this assertion on this fact: if the patient is too ill to stand a section, her lesion is probably not a local condition which might be drained by vaginal puncture, but she is critically ill from a more diffuse peritonitis and possibly bowel obstruction, which would not be relieved by vaginal surgery, but strongly indicate abdominal work. I do not contend that there are not often local pelvic abscesses from which the patient has marked symptoms of pain and tenderness which may be relieved by vaginal puncture, but these are active symptoms and active symptoms do not occur in this condition in the dying patient. These patients will all stand radical removal. In my experience with pelvic suppuration, the fact stands out most conspicuously, that the very ill patient from tubal and ovarian suppuration of gonorrheal origin stands surgery with the greatest degree of resistance. The very nature of the pathology is such as to demand radical removal on account of its more or less local confines; further, its anatomical location is such as to favor enucleation or radical removal. We cannot apply such reasoning to the puerperal infections of the pelvic viscera, whose limitations of destructive pathology are not so well marked as those of gonorrheal variety. I shall discuss this more fully when I take up puerperal infections.

I never puncture the vaginal fornix for tubal or ovarian suppuration. Dr. Price termed it "a dismal swamp operation," and my experience has been such as to condemn it in unqualified terms. There has been a tendency in the last five years to deal with all infectious lesions of the abdominal cavity in a more conservative way. Much of the operative work has been little more than puncture or stab surgery. It may be claimed by its advocates, that this incomplete manner of dealing with suppurative lesions of the abdominal cavity is conservative work, but indeed it is the cause of most extravagant surgical procedures in the end. Primary conservatism always leads to multiple operations of the most difficult character. Many of the suppurative lesions of tubal or ovarian origin which could have been dealt with radically primarily with the greatest ease, are almost impossible for a master after vaginal puncture or any incomplete procedure from above. Indeed, much of the surgical work done today is not even sufficiently thorough for the operator to have made a diagnosis by or through his surgical procedure. I have had recently in my institution at one time three patients who had had the vaginal fornix punctured for supposed suppurative conditions of the uterine appendages, each patient having consulted me within a month of the time of vaginal puncture for ovarian malignancy. None of these patients ever had any inflammatory or infectious condition of their appendages, it was a clear error in diagnosis in each case, and, as I have said, the surgery was not sufficiently thorough to even make a diagnosis. Is it any wonder that we question the authenticity of statistics when it must be apparent that these three paitents are recorded in institutional records as cures of suppurative lesions of the uterine appendages when no such condition existed? This cannot be passed by lightly with the excuse that we all are so subject to human error (to which I plead guilty), but it is the teaching of the hour to be more conservative in all lesions which may be complicated by a peritonitis. I shall discuss this phase of the subject more freely when I take up peritonitis.

I do not believe there is any excuse at this date of privileged surgery for any operator to puncture the vaginal vault for gonorrheal infection. To simply drain away the fluid and leave that great conglomerate mass of infected tissue. is the most incomplete and inconsistent procedure that is possible at this enlightened age of surgery. Certainly an operator could not make a post-operative study of removed specimens of tubal and ovarian suppuration without being impressed with the feebleness of vaginal puncture.

After seeing the great number of strictures which exist in nearly all cases of gonorrheal pyosalpinx, it should be apparent to the operator that vaginal puncture would drain but one of the tubal abscesses which existed being adjacent strictures of the tube and possibly one-half dozen abscesses remained untouched. Again, the puncture may not even enter the tube at all, but drain an ovarian abscess, quite apart from the multiple tubal abscesses; or still again, the puncture may enter the pelvic cavity external to either tubal or ovarian abscess, and simply drain the periuterine area.

The intestine has been punctured per vaginam a good many times in an effort to drain the pelvis

for tubal and ovarian suppuration. It is absolutely unnecessary as it is unsurgical to make an opening in the vaginal fornix, which is a fresh wound in an infected field fertile with absorbents. It will establish communication from a pus area above, through a fresh wound made in a lymphatic area, with an infected canal below. Every abdominal operation is a strong plea for that route in dealing with suppurative lesions of the uterine appendages. Each operation reveals many complications which would have remained undiscovered and untouched by vaginal puncture. It must be understood in all pus-forming conditions of the abdominal cavity, that it is not the lesion *per se* which is often the cause of the fatal termination, but the complications of such conditions.

This is especially true of gonorrheal pyosalpinx and ovarian abscess. I believe it can be said that very rarely is the local condition the cause of death, but it is the complicating peritonitis with resultant bowel obstruction, distal abscess, metastatic infections, etc., as a lesion *per se*.

I have never been able to see how any surgeon who was familiar with complications of tubal and ovarian suppuration could resort to vaginal puncture. He could not have, if he had for any length of time witnessed the work of Joseph Price in these conditions. This is another subject in which I feel licensed to indulge in a dogmatic expression and say it is not a question of difference in opinion, but one of difference of facts.

In discussing the subject of vaginal puncture for gonorrheal tubal and ovarian suppuration, I leave little room for the reader to misunderstand me.

We never do vaginal puncture in the Joseph Price Hospital for tubal and ovarian suppuration. In conclusion, our reasons are: first, it is a "dismal swamp" operation; it punctures one and leaves one-half dozen abscesses intact; it simply drains away the pus of a single abscess, leaving a great conglomerate mass of suppurating tissue; it makes a fresh wound, in a lymphatic area connecting a pus area above with an infected canal below—all unsurgical. Again, the patient is not particularly ill on account of the local pus condition accessible to puncture, but from the superimposed lesions—peritonitis, bowel obstruction, distal abscess, etc., which are entirely beyond the reach of vaginal puncture. Further, there is a possibility of wounding important viscera, as the operation is not sufficiently thorough to even make a diagnosis of the real condition; instances of which I have seen in great numbers.

There are probably very few instances in which a vaginal puncture has saved life. If the condition was sufficiently local to have been relieved by vaginal puncture, the patient would in all probability have gotten over the acute local condition by simply resting in bed. Further, if the patient is as ill as the vaginal puncture advocate claims, the chance is that she is suffering from the complications of the tubal and ovarian suppuration which will not be relieved by vaginal puncture. Now, if you please, view this important subject from above and the mist clears away; it is then you become intelligent as to the real nature of the pathology in every particular, of the honeycombed mass of diseased viscera which may extend from the umbilicus to the coccyx. I question at this date whether many of those gentlemen who do me the honor to read my discussion of this subject will agree with me; but permit me to make this assertion, that all will agree with the views of the late Joseph Price after a decade or so. It is already my experience that many patients who have had puncture surgery performed upon them are coming to me for complete surgery for pus-forming lesions of the abdominal cavity.

I always exhaust all my resources to make an accurate diagnosis of the infecting source before I open the abdomen; but after the abdomen is opened, I then forget or pay little attention to the primary source of trouble and deal with any pathological condition which presents itself.

One must learn a methodical and systematic method in all surgical procedures. Do not dive or delve headlong through pathological membranes or inflammatory barriers to seek the primary or distal infecting source, but surgically content yourself with any abnormality or pathological product which first presents itself. Remember, in the neglected suppurative conditions of tubes and ovaries, we are often dealing with terraced or stratified pathology which may begin above the umbilicus and end with the coccyx. Also, remember that the lesions which are superincumbent upon the suppurative mass below the ileopectineal line are probably of more importance and have more bearing on the patient's condition than the primary trouble.

In other words, suppurative lesions of the uterine appendages can seldom be surgically treated as lesions *per se*. All of these reasons are the very strongest arguments for abdominal surgery, as opposed to vaginal puncture.

Thorough abdominal surgery for all pus-forming lesions in which the ever-embarrassing and endangering adhesions are to be dealt with, cannot be done with the gloved hand; and it is my opinion

that the rubber glove has much to do with the incomplete or puncture surgery of the day. The rubber glove has so increased the trauma incident to peritoniteal surgery, that many operators have abandoned complete procedures for the less radical and always to be condemned make-shift operations. One cannot deal with these universally adherent conditions by placing the patient in the Trendelenburg position and then attempting to use the scissors and knife under the direction of the eye. I regret that those who are interested in this subject could not have seen the greatest of all masters of this work, the late Joseph Price. Even by his numerous enemies he was the recognized master of the field. His ability to deal with adhesions and enucleate fixed and suppurative specimens was superb to the superlative degree.

I ask the patience of the reader who may not have known or loved Price as I did, to permit me to stamp his name indelibly upon this class of work, for no man living or dead was more its master. If this is so, what were his methods in the conduct of such cases?

Permit me to take as an example one of those exaggerated cases of gonorrheal tubal and ovarian suppuration in which the pathological condition begins at the umbilicus and extends to the coccyx.

The patient we are about to operate upon is forty-five years old; she has been an invalid for years and probably contracted her initial Neisserean infection twenty years ago, which is often the history of these exaggerated conditions. There is nothing diagnostic about her menstrual life, which also is often the case. This patient has had for years periods of different lengths of time in which she has been bedridden with pain, which I believe in her case was due to local attacks of peritonitis, incident to some traumatic influence which caused an acute extension from the old infecting source. This is the usual history of such cases, yet in some there is no history of sufficient pain to put the patient to bed. This patient told us she was very careful about going downstairs, she avoided all jars; in other words, she had pain upon locomotion. Her blood count tells us little. If she had presented herself at the apex of one of her acute attacks of local peritonitis, she would probably have shown an increase in the white cells. We do not permit the blood count to influence our work.

The patient is pale, she is not assimilating, she is not a good surgical risk; yet it is astonishing the powers of convalescence such patients have if the cause of destruction is removed. These patients go on for years with such history until they are incapacitated and then generally enter the hospital on account of some acute attack of local peritonitis.

Upon vaginal examination we find this patient's pelvis solid, all structures are agglutinated; I call it "a frozen pelvis." She is solid from her umbilicus down; indeed, many of these patients come to me with the diagnosis of fibroid tumor on account of extreme resistance due to this exaggerated suppurative condition of the uterine appendages and the superincumbent and fixed abdominal viscera. The entire lower half of the abdominal walls is not participating in respiration; so she has not only suffered from faulty metabolism due to blood dyscrasia, but she is not able to exercise her full respiratory function. It has been explained to this patient's husband the dangers and magnitude of the operation. She has already been made aware of her extreme condition by other operators, who have pronounced her inoperable. This operation from a physical standpoint will be nothing short of a prize-fight to both patient and operator.

I make my incision higher than for the average section for removal of diseased uterine appendages, otherwise I would enter, not the free abdominal cavity, but this huge inflammatory and suppurating mass.

Again, it is necessary to enter the abdominal cavity at a high point on account of possible injury of the bladder. In all large uterine and ovarian tumors and in extensive suppurative conditions of the uterine appendages, the bladder is often pulled up in front and is predisposed to incisional injury.

I now begin to deal systematically with this stratified or terraced mountain of pathology. I speak of it as a terraced mass, as I shall deal with the conditions by removing one layer at a time. The first anatomical structure with which my fingers come in contact is the fixed omentum. I shall attempt to release it by making gentle traction on it with my right hand, while I release its point of fixation by insinuating the index and middle fingers of the left hand around and below its fixed point. One must never attempt to dislodge or break the adhesions of any fixed viscus by traction. Traction on the mesentery is a most potent factor in the causation of shock and must be most studiously avoided in these burdened patients. Indeed, it is my opinion that many operators have abandoned complete or radical procedures on account of the shock they have occasioned through their manner of handling viscera; so I simply make sufficient traction on the omentum to define its fixed point and release it as described above.

I have now released the omentum and one can see that its point of fixation is gangrenous; it has sacrificed this portion in order to protect the general abdominal cavity. I shall next deal with the gangrenous portion of the omentum by amputating the destroyed portion. With a number two (2) silk ligature I transfix the center of the omentum well above the gangrenous portion and then tie both ways. This anchored ligature has no tendency to slip over the stump, which is likely to occur if one simply throws the ligature around the portion of tissue to be removed. I now infold the incised end of the omentum by a 00 silk ligature to prevent future adhesions. You see I meet the conditions as I come to them! never pass over a condition with the idea of returning to remedy it; you may later overlook some important point which is in need of attention.

I now proceed with the next layer of "terraced pathology," which happens to be, in this case, a portion of the ileum, I know not which portion and care not; it is enough to know that it is a part of the pathological condition, so I proceed to deliver the first portion of the small bowel with which my fingers come in contact. I proceed with the delivery of the ileum in the same manner as I did with the omentum. I make very gentle traction on any portion of the bowel I can deliver and then follow it through its continuity of structure until I reach its fixed point and then attempt to lift it from its adherent position with my left index and middle fingers. You see with what difficulty I release the fixed bowel and how impossible it would be to do this by traction.

I have been hard at work for some minutes and have not as yet gotten even in proximity of the ileopectineal line. I have at last gotten this piece of small bowel loose from its fixed point and, as I anticipated, it will need repair of an extensive laceration of its serous coat.

It is astonishing how one can encroach upon the lumen of the bowel without causing obstruction. I have a great number of times reduced the lumen to one-third its normal caliber without any future trouble. Try to avoid resections of the bowel in these suppurative conditions. I have placed hundreds of repair sutures in what seemed to be very questionable bowel, with no bad results. You will often be astonished at the recuperative powers of the infected bowel, if all bowel obstructions are relieved and systematic repair done. You will not get good results in repair of damaged bowel in a superlative degree unless all adhesions are broken and incomplete bowel obstructions due to fixed points are relieved. The distension proximal to such partial bowel obstruction will produce sufficient tension on the repaired bowel to interfere with union of the lacerated areas and predispose to fistula, peritonitis, etc.

At short intervals the nurse pours hot saline solution over the small bowel which I have been repairing, and the eviscerated organs are kept under hot towels, in order to prevent shock and collapse; however, do not hamper yourself through an attempt to cover up viscera with towels which may get much in your way while dealing with the bowel. Remember, in these patients with extensive adhesions, there is much to do and it is essential to use all dispatch. Dr. Price was in the habit of saying, "Stick to your surgery, but do not let your surgery stick to you," by which he meant, do thorough work, but get through.

I have now released all the small bowel which constituted the second layer of the mass; let us proceed with the third layer. In my attempt to get into the true pelvis with my index and middle fingers, I find I am blocked at every point; there seems to be a complete roof over the pelvis viscera. Remember, in a true sense, there is no such thing as an inflammatory barrier and that this supposed barrier is composed of viscera of vital importance, so we cannot blast our way through. Of what is this impenetrable roof most apt to be composed? In a very large per cent. of these neglected cases, the big redundant sigmoid throws itself over the inflamed tissues in its attempt to isolate them from the general abdominal cavity; or one may find the sigmoid and cecum adherent together behind and above the suppurating uterine appendages. Dr. Price was in the habit of saying, "I find the sigmoid and cecum horse-shoed posterior to the pelvic mass." It is astonishing to what tremendous proportions the sigmoid becomes in its effort to encircle or cofferdam the pelvic disease. I have seen this great redundant sigmoid with walls so thick that it was impossible to distinguish it from the thick walls of the uterus. Indeed, it so outgrows itself that it is almost impossible to recognize its entity.

In an attempt to enucleate or deliver the long-fixed uterine appendages, remember, it is the sigmoid which is in the greatest danger of injury.

The rectum must also be kept in mind. I have seen great holes admitting four fingers torn in the sigmoid, in the operator's effort to remove fixed appendages. The operator did not view the pathological condition as one of a terraced mass, and had thus not proceeded to reach the pelvis by re-

moving the pathological structures in layers, but had passed his hand from above entirely through the redundant sigmoid; this might happen to the most careful operator, as these conditions are next to inoperable. This mass which seems to form an impenetrable partition between the pelvic and abdominal cavities, I take to be in this case, the redundant and much thickened sigmoid of which I have been speaking.

I am now making an extreme effort to find a point of cleavage which may lead into the pelvis, and I am making this effort well over toward the right side in order that I may keep as far from the sigmoid as possible. The cecum is not as apt to be in the pelvis as the sigmoid; so I am not as prone to injure it by my attempt to enter the pelvis on the right side.

I have not as yet found any point through which I can make any impression on this barrier. I was making a like discussion in one of these difficult cases when a friendly physician said, "Do not believe him; he has gotten that mass all ready to deliver and will have it out in a second." The only comment I could make to my friend was, "If you are attempting to be spectacular in your surgery, do not choose the 'frozen pelvis'."

I have at last succeeded in finding a point of cleavage well over on the right side and I take it for granted that my two fingers are passing down between the head of the cecum and a huge sigmoid; so in this particular case, we have the sigmoid and cecum united or horse-shoed behind and above the pelvic mass.

I have not as yet touched or in any way recognized the uterus or its appendages; I have had enough to do. Think again, if you please, of vaginal puncture for this case. I do not mean to be disagreeable, but it is these patients who convey the proper mental picture of our duty.

I have now pretty well succeeded in enucleating and releasing the sigmoid and cecum from each other and from the underlying tissues. Note now the great redundant and much-thickened sigmoid. We could scarcely recognize it as a portion of the big bowel; its walls are one-half an inch thick and it looks as though it would never return to its normal outline, position and function, but it will. I shall refer to this helpless-looking sigmoid again when I speak of drainage.

I shall now proceed to repair any injuries of the cecum or sigmoid which I have occasioned. I find the cecum in very good condition, as might be expected, as it has not participated in defending the general abdominal cavity to the same extent as the sigmoid. We find several injuries to the sigmoid, which I now repair. If you learn to tie with a needle in your hand, you save much valuable time. I have illustrated this method of suturing and tying in other publications.

I am using the ordinary cambric sewing needle of the smallest size, which will admit the 00 Chinese twist silk. Do not permit the use of silk in the abdominal cavity to worry you. There has been no catgut or absorbable ligature used in this hospital for about a quarter of a century.

I have now finished with the third layer of the terraced pathological mass and I have not yet reached the primary infecting lesion, nor have I tried directly to exhume the buried uterine appendages.

I am now proceeding to deliver the fourth layer of pathological structures, which in this case is supposed to be the suppurating uterine appendages; so I begin again to find a point of cleavage, a seam or crevice which will permit me to enter the true pelvis. All work up to this time has been done above the ileopectineal line. As a rule, I begin my effort to find some point of cleavage between the adherent pelvic viscera just back of the fundus of the uterus. If I am not able to enter at this point, I next try well over to the right side, for the same reason I gave while discussing possible injury to sigmoid or rectum. The cecum being less apt to be in the pelvis, complicating the condition, the pelvis as a rule is more empty on the right side and gives a more accessible point for entrance. In this particular case after strenuous efforts, as you see, I am able to find the point of cleavage back of the fundus of the uterus, which is often hard to recognize, and was so in this case.

I have at last entered this point of cleavage to the full extent of my middle and index fingers, and the pus and blood which flows from the incision and floods the abdominal wall show that I have ruptured the suppurating pelvic mass. I make no effort to wash or sponge away the great quantity of pus or blood which is covering the lower one-half of the abdominal wall, but keep on in my efforts of enucleation.

When you have found a point of cleavage leading into the pelvis, stay there; do not dance around and seek other points, but follow out the line of cleavage, insinuating your fingers between the pelvic viscera along the lines of least resistance. I find in this case, my line of cleavage leads from the fundus of the uterus in front directly posteriorly between two lateral masses, which I take to be the right and left uterine appendages; so in this case I have not

as yet ruptured either right or left tubo-ovarian abscess; therefore, the great amount of pus seen so far has come from the true pelvis and is external to the tubal and ovarian abscesses; so if I had made a vaginal puncture and entered the pelvis from below at the same point I have entered from above (and this is where my puncture would have been), you see I would still be external with my drainage to the tubal and ovarian abscesses.

I must say even more than this against vaginal puncture in this case. This great amount of pus seen welling up and which has not come from either tubal or ovarian abscess, is not accessible to puncture drainage from either above or below; I have used great strength in breaking up the partitions and trabeculae which ramified the abscess and divided it into many compartments converting the pelvic mass into a honeycombed arrangement. The drainage of any one compartment would be of no avail to the numerous others; indeed, I have often seen just this condition of affairs follow vaginal puncture.

I am now making an effort to deliver the right specimen. I have been able to pretty well enucleate the mass, but I find that at a certain point deep down in the pelvis, it seems to be nailed to the pelvic floor. This fixed point is probably the location of the fimbriated extremity of the tube and the probable location of the very earliest site of adhesions which were the cause of the tubal occlusion.

With my right hand I make slight traction on the right tube at its uterine extremity and then I follow along the tube (whose location has been made more definite by slight retraction) with my index and middle finger of the left hand until I reach its most dependent point in the pelvis, and attempt to lift the tube from its fixed point by insinuating my two fingers beneath it. This fixed point of the fimbriated extremity of the tube is not unusual, and many operators who do not follow the tube to its distal fixed location, break the tube well above its fixation, leaving a good portion in the pelvis.

Now notice that since I have delivered the right specimen, there is no direct connection between the tube and ovary and also that, in a sense, the ovary is not participating in the destructive process; the ovary, however, is infected and I remove it with the tube. I accept it that this brings out with great emphasis a contention I made in my earlier remarks regarding the manner of infection of the ovary. Had I found the tube grasping the ovary or intimately associated with it, we would then have had a destruction of the organ with a formation of a tubo-ovarian abscess; but in this case, as I explained in delivering the tube from its fixed point at the bottom of the pelvis, there had been no direct connection between the tube and ovary, thus we find the ovary in a fair state of preservation, even though it may be infected.

I shall now proceed to remove this right specimen which I have delivered well above the incision. Had the uterus been retroverted it would have been necessary for me to have broken up the adhesions of the left side before I would have been able to deliver the specimen on the right side. This is often necessary before we can deal with thorough removal of the suppurating appendages.

In order that I may remove all of this infected tube, I make two small incisions in the cornua of the uterus, one on either side of the tube; I thus remove every cell of the tube and then close the small area in the cornua of the uterus with No. 1 silk. I make a transfixion through the center of the pedicle of the specimen with the oöphorectomy ligature-holder, which is threaded with No. 4 silk; as I withdraw it, it leaves a double ligature. I now pick up the two ends of either ligature and make a slight traction, and then pick up one end of the other ligature and make a traction upon it. If this ligature slips or slides through its point of fixation without producing friction on the other ligature upon which I am making slight traction, then the two ligatures are separate and do not form a figure eight (8), and one might get some hemorrhage from vessels not included in the tie. If you do not feel the friction you should if the ligatures were entwined, simply toss one end of the ligature between the two ends you are holding or making traction upon; this always produces the figure eight and permits no untied tissue. I have continued to use this method of tying which was used by the older operators, because, with this method I have never seen an abdominal hemorrhage. Dr. Price used this method exclusively.

I now tie off the uterine end of the specimen and the ligature slips off the cornua of the uterus from which I have incised the end of the tube and passes beneath the incised end of the tube which my assistant holds up, in order that I may tie below. I place a surgical knot in the ligature and then in my tie I permit my two thumbs, with which I make tension on the ligature, to pass the point of tie in order that the convexity of the tie is toward me. By so doing I lessen the friction in the surgical knot and thus get a tighter tie.

I now pick up the other ligature and make the tie of the outer or external half of the pedicle, which probably contains the ovarian artery. Before I

sever the tube and ovary I repair the cornua of the uterus, as the specimen gives me a good handle to make traction upon and thus hold the small area to be repaired, well up into the incision. In amputating the specimen, you must cut the pedicle cone-shape; remember, the pedicle retracts from its center and not the bite of the ligature. In surgery we must constantly have in mind the mechanics of the operation, but never permit mechanics to interfere with the mental picture of the pathological condition.

I have now closed the small area in the cornua of the uterus which remained from complete amputation of the tube. In a considerable number of cases of tubal infection, there exists an isolated abscess in the uterine end of the tube, and if the tie in removal of the tube is distal to such abscess, it may be neecessary at a late date to operate for such condition as a secondary abscess. It is nearly always a fertile source for adhesions and is the infecting source for a dead ligature. Indeed, it is not the quality of the ligature which is so often the cause of an infected or dead ligature, but it is the remaining pathology which is the source of infecting the ligature which has been placed in an infected area. If this were not so, I am sure we could not use silk exclusively in all the pus work we do without trouble from it; and if we were getting dead ligatures with resulting fistula, I am even more sure we would have given up the use of silk years ago.

I now proceed to deliver the left tube and ovary. I have already enucleated or elevated the big sigmoid which had formed a roof over the specimen. I again seek a point of cleavage between the posterior aspect of the uterus, the broad ligament and the specimen, and I deliver the left side, just as I did the right, by keeping my enucleating fingers in line of cleavage, following up any advantage I may have gained in an effort to enucleate or deliver the infected mass. As I said before, one must exercise the greatest care when dealing with the left specimen in order to prevent injury to either sigmoid or rectum.

As I partially deliver this specimen, there are a few adhesions between the sigmoid and specimen which I have not broken. I break these adhesions by pressure with the palmar aspect of my fingers. Learn to use the palmar aspect of your fingers in breaking adhesions. Never upset your hand. Work with the palmar aspect upward. I have never seen Dr. Price introduce more than two fingers into the abdomen in my life. The introduction of the entire hand and forearm, which is so often seen today, means that the operator has not made a diagnosis before the operation: indeed, there are very few operations in which the incision should be sufficiently large to admit the hand.

Earlier I called attention to the fact that I was paying no attention to the admixture of pus and blood as it flowed from the incision and obscured the field of work. To attempt to sponge away this discharge would entail a loss of time and avail nothing. As I said before, this work must be done entirely from sense of touch; therefore, any attempt to clear the field of operation is not only a loss of valuable time, but when one withdraws the enucleating fingers from the line of cleavage already made, he not only loses the site of enucleation but increases the hemorrhage by withdrawal of his fingers.

Now I have pretty well delivered this left tube and ovary above the incision; quite a different picture of pathology from that of the right tube and ovary presents itself. In this specimen the tube and ovary are an indistinguishable mass; the tube, as it were, grasps the ovary and is in such intimate relation to it we can scarcely see a line of demarkation between what was the fimbriated extremity of the tube and the ovary. The ovary is entirely destroyed and probably in this case forms a continuous abscess with that of the tube; it is truly a tubo-ovarian abscess. This is what we should expect in this form of tubo-ovarian abscess, in which the infected tube early grasped the ovary as the ovary came to the rescue of the general abdominal cavity in its effort to prevent a more general peritonitis and was thus sacrificed by an overwhelming dose of infection through its peritoneal surface.

Although this specimen was on the left side, the danger side on account of the sigmoid and the side on which adhesions are most often numerous and hard to break, I had less difficulty in delivering this specimen than I had on the right side. I give as my reasons for this condition the assumption that in the very early history of the tubo-ovarian abscess of the left side, the infection was effectually blocked by the intimate adhesions between the tube and ovary which this specimen shows, and therefore we did not have to deal with extensive adhesions, which would have occurred from a leaking tube, with resulting attacks of local peritonitis.

I also want to call attention to another interesting fact in the pathology of this specimen. Although this ovary is entirely destroyed, I was not able to shell or peel the ovary from its surroundings and cast it off as a separate and distinct abscess

without hemorrhage or need of ligature, as I probably could have done if the overwhelming dose of infection had come by the way of the bloodvessels through its surgical neck.

I will now remove this specimen by the same steps I executed on the right side. I cut a V-shaped section out of the fundus of the uterus in order that I may remove the entire infected tube, then close the space by a few simple Lembert No. I silk sutures. We always do stumpless surgery; it is the remaining one-tenth or one-twentieth of the pathological specimen which produces the dead ligature and not the nature of the ligature.

The attempt to place the acute pus-forming lesions on the waiting list in order to secure the quiescent stage for operative measures and the incomplete surgery from above and vaginal puncture from below, will result in just what we have here encountered.

It remains for me to cleanse the field of operation and then take up the matter of drainage in these cases.

As I released the viscera and then repaired them seriatim, I also flushed the viscera with hot saline solution of a temperature of 115° to 120°. In my attempt to finally deliver the pelvic specimen I, of course, spread some contamination from free pus to the adjacent viscera, but I will not re-eviscerate for purpose of cleansing such organs, for this reason: the pus in these very old conditions is not of extreme infectious nature; many authors claim it is quite sterile; I do not like the statement, however; again, I expect to extensively drain this patient with the Price cofferdam, so I do not intend to make more than a local toilet of the pelvis.

I use the Price irrigator, a simple affair; it consists of an ordinary funnel, eighteen inches of rubber tube and a hard rubber nozzle ten inches long with a flushing diameter of one-half inch. The lower two-thirds of the nozzle is obliquely perforated by numerous openings one-eighth of an inch in diameter. These oblique perforations of the tube are of such an angle as to direct the flow in an upward direction; the caliber of the tube is of sufficient size to permit considerable force, so that all clots and débris are washed from the bottom of the pelvis.

We are now ready to irrigate the pelvis. I pass my left index and middle fingers into the pelvis and first withdraw the viscera therefrom and hold them above the ileopectineal line with my two fingers and then introduce the irrigator to the bottom of the pelvis. My two fingers which, controlling the viscera, have made with the irrigator a trivalved speculum, so to speak, which gives an open space for the water and débris to come from the pelvis with a gush. The big blood clots and inflammatory débris are thrown from the pelvis with considerable force. One can more quickly and thoroughly make a toilet by flushing than by excessive sponging. It is done with much less degree of trauma and then the hot solution is not only hemostatic but a very powerful stimulant, which these patients much need after such trying procedure.

I have perfect control of the viscera with my two fingers and the back of my left hand. The intestine does not protrude from the incision as it would had I not complete control of the viscera.

I now introduce a gauze towel to remove some of the excess saline solution remaining in the pelvis. With the long dressing forcep I slide the towel over the palmar aspects of my two fingers, which are still controlling the viscera and keeping them from collapsing into the pelvis. I do not only quickly and easily pass the towel into the pelvis, but my fingers protect the viscera from the trauma incident to such manipulation.

It is impossible to do these extreme operations without in every way possible reducing trauma to its minimum. There is a thousand times more danger in permitting one adhesion to remain as a potential possibility of bowel obstruction, than there is danger in the trauma incident to its proper release. This has been the great point of contention and it was the positive view of Dr. Price that all adhesions must be broken and the distal infecting source reached, which made him the greatest of all masters in this work. When I take up the toilet of general peritonitis, I shall have much to say about thorough and proper methods of irrigating the abdomen.

I expect to drain this patient with gauze and will insert the classical cofferdam. Dr. Price first used this system of extensive gauze drain in 1878 in the slums of Philadelphia. He had been sent by the Coroner to perform an autopsy on a woman who was supposed to be dead from a criminal abortion. When he arrived he found the patient still living, but in practically a moribund condition from a general peritonitis. He eviscerated and flushed the patient out with hot water and drained her with his system of extensive insertion of gauze, or material we used as gauze at that date. The patient lived. This incident probably had much to do with his future treatment of like cases.

I drain this patient for several reasons. Not so much on account of the pus that has flowed over the sides of the table, but for mechanical reasons.

I have amputated the gangrenous omentum; I have repaired the lacerated and infected ileum, which was twice its normal size, possibly from both hypertrophy and infiltration; I released the redundant and infected sigmoid which formed a roof over all the pelvic disease; I separated the cecum from the sigmoid which had become horse-shoed posterior to the uterus; and, at last, I dug the uterine appendages from their fixed position in the pelvis. In other words, I made a great excavation which had been filled with infected, infiltrated and half paralyzed viscera. It is the mechanical function of the cofferdam of gauze which is so valuable in preventing these infected and partially paralyzed organs from prolapsing into this infected well and later producing a post-operative bowel obstruction. It has also other mechanical functions; it not only prevents the viscera from prolapsing into the infected pelvis and later becoming adherent, with the production of post-operative bowel obstruction, but, by elevating the engorged and thrombotic viscera, it improves the circulation, encouraging the process of repair of such viscera. It has another important mechanical function: after such difficult enucleations there is considerable bleeding from hundreds of sources; the cofferdam is not only the best, but the only, method of preventing such oozing with the formation of blood clot in the midst of an infected area, with the probability of the formation of a pelvic abscess.

I believe that the simple glass or rubber tube has no place in these extensive suppurative conditions. If this patient had not had several lesions of the viscera, if the bowel had not been so big and redundant and I had simply to deal with adherent uterine appendages, even though there had been considerable pus, I would not have drained unless there had been much bleeding from the numerous pelvic adhesions; I would then have inserted a Koeberly glass tube as an index to the amount of oozing and a means by which I could have removed the blood in order to prevent infection of the clot.

The very strongest argument I can offer that this is the proper method of dealing with these extensive lesions is just this: in twelve years' experience with Dr. Price, who did so much of this work, and in my own experience, I have never seen an acute post-operative bowel obstruction!

I now insert the cofferdam. I again pass my left index and middle fingers into the pelvis, elevate the bowel from the true pelvis and retain it by my fingers, while I insert the cofferdam. The insertion of this extensive system of gauze drain should be a piece of perfect civil engineering.

I begin well over to the left side of the pelvis, below the big sigmoid, which I am keeping from prolapsing into the pelvis, and insert these pieces of gauze, which are twelve inches long, one and one-half inches wide, and folded until they are of eight thicknesses, and insert them one against the other by the aid of a long dressing forcep, until I have erected a solid cofferdam posterior to the uterus and broad ligament, entirely filling the pelvis.

Nothing has been so unfortunate as the substitution of tube drainage for gauze. You cannot surgically handle these extensively infected and suppurating conditions unless you are familiar with the system of cofferdam drainage. One of the reasons that gauze has largely been abandoned as a drain is, that operators have not taken into consideration the mechanics of the drainage and have not used it as a solid cofferdam, but have run strands of gauze as flying buttresses to supposed infected and dependent points in the abdominal cavity, and have by such indiscriminate insertion of the drainage, produced post-operative bowel obstruction from these guy ropes inserted promiscuously among the viscera. The cofferdam will not produce a bowel obstruction, for it was inserted as a solid wall damming off the pelvis and lower abdominal cavity with no room left for the viscera to get between the strands of gauze. I have never had any trouble from pressure on the rectum by the cofferdam; if you do have, you can obviate it by inserting a rectal tube and permitting it to remain some time.

Those operators who have had trouble from such pressure of gauze on the rectum, did not in reality have an obstruction of the rectum from the gauze drain, but the bowel obstruction came from the fact that the sigmoid was not held out of the pelvis during the insertion of the cofferdam and the obstruction came from pressure on this viscus.

Ordinarily I do not place any sutures in the abdominal wall in such cases, but I have made a very long incision in this patient in order that I could enter the abdominal cavity above the line of fixed viscera, which extended to the umbilicus; so I will insert two or three silkworm gut through-and-through sutures.

The cofferdam will not be touched for seven days. At the end of that time it will be removed and a small gauze drain inserted in the lower angle of the incision: the incision will then be strapped as tight as possible. At the end of forty-eight hours more the small drain is removed and the few sutures also taken out, the incision again strapped as tight as possible and no further drain is ever inserted.

After this patient reaches her room she will have

a big, old-fashioned mustard plaster put over both lungs and the foot of the bed will be elevated eighteen inches; we never use the Fowler position. She will be surrounded by several hot soap stones and given saline solution in the bowel. To my knowledge there has never been an operative pneumonia in the history of the Joseph Price Hospital.

I have no solution for this almost unbelievable statement, other than the possible difference in the conduct of our operations. We give as little ether as possible and give it exclusively; we never use the Trendelenburg position in operating; we never use retractors whose trauma is a cause of shock; we always remove the distal infecting source in pus conditions, which may prevent metastasis to the lungs. In the very old, the very young, and in prolonged operations, we always cover the chest with a counter-irritant.

We are very careful in having the chest and entire patient protected before she left the operating room. I have always felt that the conduct of the patient to and from the operating room was a fertile source of chest conditions. The patient's bed should also be warm.

For a number of years we were in the habit of beginning to remove our cofferdams at the expiration of forty-eight hours; we found every now and then we had some bleeding following removal of part or all of the cofferdam; this would be followed by some secondary infection, manifested by fever, increase of pulse, etc. Also, it was more difficult to remove the drain at this early date, so we began to remove the drains on the third day, then fourth, fifth and sixth day; now we do not touch these big cofferdams until the seventh day; we then find that the drains come out more easily, and there is no after-bleeding or secondary infection incident to removal of the drain. The viscera by this time are well glazed over, their absorbants have been cofferdammed, so to speak, and there is practically no danger of secondary infection or post-operative bowel obstruction from the intestine coming in contact with the infected areas. The gauze by this time has established a good drainage canal and there is practically no danger of local collection of pus or formation of post-operative abscess. As we have not had post-operative bowel obstruction or post-operative abscesses, we feel our system of drainage is correct. While we have been in the habit of placing a small gauze drain after removal of the cofferdam, permitting it to remain for forty-eight hours in order to continue a local drainage at the lower angle of incision, I am now beginning to not even insert this small drain but strap the incision as tight as possible as soon as the cofferdam is removed. There is too much meddlesome work done to the drainage incision. After the cofferdam and the small secondary drain are removed, we never again enter the incision with any kind of drainage and never make any flush toilet of the wound; in other words, we never go below the level of the skin with drainage or toilet. This teaching also applies to those bad fecal fistulæ which may follow difficult pus work. All pus incisions and fecal fistulæ will heal in one-fourth the time if one will scientifically neglect the wound. Simply cleanse the skin about the wound with alcohol and touch occasionally with tincture of iodine and dress with sterile gauze as often as necessary. I have never known why it was that there is an inherent tendency for everyone to press or squeeze a boil or make local pressure near an abscess to increase the flow of pus. That loose pus or fecal matter in the wound which such meddlesome treatment may expel, is doing no harm, it is not under tension and is not being absorbed; but when you begin to make pressure by squeezing the parts you produce some fresh bleeding which is followed by absorption of pus, producing secondary infection.

I have had two and possibly three patients killed for me by meddlesome tampering with my drains and re-insertion of drains for weeks, against my instruction, after my cofferdam had been removed at an earlier date than I had advised.

In a number of instances I have seen men packing a fistulous opening in a bowel with gauze and then wondering why it did not close.

When you leave the wound, be sure you leave no disease behind; but after getting out, stay out. Practically all fistulous openings into the bowel (providing the pathology has been removed and all bowel obstructions distal to such fistulæ released) will close without treatment, unless you are dealing with tubercular peritonitis.

Why did I not remove the uterus? The uterus in this case was not enlarged, it was really undersized and did not contain any local abscesses. I removed a piece of each cornua of the uterus surrounding the tube, so that I have no point of possible infection from that source. It adds to the risk of these extensive suppurative conditions to open up fresh areas which would be done by hysterectomy; it would also prolong the operation and add to shock. If the uterus had been big, soft and infected, or contained intramural abscesses, or, if it had shown extensive infection in the cornua of the uterus, I should have done a hysterectomy.

Do I operate in all cases in the earliest stages of gonorrheal salpingitis? I do not always operate, because I have a horror of unsexing so many

of these young women who are in no way to blame for this vicious infection. It would be good surgery to operate early on every case of gonorrheal salpingitis. I cannot agree with the general teaching that the mortality would be high if operations were done in the acute stages of gonorrheal salpingitis. If all cases were operated upon early and complete amputation of the diseased uterine appendages were done, the total mortality would be much lower than it is at the present day, when one is seeing a great number of horrible cases of neglect. The great difficulty of our profession in getting together as a unit on any particular subject is that we discuss the matter from different viewpoints.

The mortality would be much lower if early removal of all cases of gonorrheal salpingitis were done.

I am aware that anyone's mortality for any given number of cases would be lower were he to operate after the subsidence of acute symptoms, than it would be were he to operate in all acute spreading conditions; but who is going to give assurance that any particular case will become a quiescent one?

When speaking of mortality, these are the questions that must be answered, and which, I am ashamed to say, we as a profession do not answer, for the simple reason that we lack individual responsibility, present and future, for each and every case we see. In considering the mortality our actions should be controlled, not only by the immediate factors of danger in the operation, but also by the future mortality which hang over that case.

What is the primary operative mortality; what is the secondary mortality; what are the dangers of secondary conditions incident to waiting; what is the morbidity, etc.?

If the future of gonorrheal salpingitis were taken to determine its mortality, morbidity, complications and spread of infection, we would be a unit upon its uniform early removal. It is the unknown which divides us as operators.

Drainage is a very interesting subject to me and I have given it a great deal of thought. I am more convinced each day that it is not the extensive system of drainage which predisposes to adhesions, but it is the incomplete removal of lesions, the lack of thorough primary work (breaking of adhesions and proper toilet) which produces the harmful adhesions. I have re-opened these patients who have had a cofferdam inserted and have been gratified to find so few adhesions, possibly only a friable cobweb-like veil to the scar; or if there had been no hernia following the open treatment I have seen cases in which there was not a sign of adhesion. This is most astonishing when you consider that for fourteen years, 45 per cent. of the abdominal work done in this hospital has been re-operations and I have never opened but one case in which I did not find adhesions. I offer as my solution for this, buried catgut, the trauma of retractors, the rubber glove and incomplete work. The harmful adhesion is the long cord-like one which extends like a flying buttress from some point in the scar to a remaining portion of the primary pathological lesion and is a very fertile source of bowel obstruction. The thin, cobweb-like veil which may follow the cofferdam is not a potential source of bowel obstruction.

In those conditions where you have packed more to check hemorrhage than for pus or peritonitis the packing is followed by numerous adhesions; so the more nearly we get our drainage directly proportionate to the necessity of such drainage, the better the results in every particular.

BRAIN INJURIES.*

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Anatomical and physiological observations on the covering membranes and circulation of the central nervous system.

The dura is a dense membrane closely attached to the inner surface of the skull whose periosteum it forms. In childhood it plays an important part in development of the bone. It can be easily stripped from the greater portion of the vault of the cranium; at the base it is more densely attached to the bone and can, in certain locations, be removed with difficulty. Hence, in these locations, it is easily and frequently torn in fractures extending to the base. In children the dura is closely attached to the sutures, and in extra-dural hemorrhage during infancy the clot is usually confined to a single bone. The inner layer of the dura is prolonged at the exits of certain of the cranial nerves forming a sheath for them. This is noticeably true of the optic nerve, and becomes a factor in the production of choked disc in cases of compression.

The dura is composed of two layers. The outer layer, as previously mentioned, forms the periosteum of the bone; the inner layer is less dense in structure, is lined by endothelial cells, and affords a smooth covering for the more delicate arachnoid underneath it. At certain places the layers become separated, forming the venous sinuses of the brain.

* Read before the Society of Physicians and Surgeons, of Louisville, Kentucky, May 18th, 1916.

A reduplication of this inner layer forms the falx cerebri and the tentorium cerebelli. These structures are dense, more or less unyielding, and afford support and protection to corresponding portions of the brain. They are of practical importance in the study of compression, inasmuch as they tend to limit the brain pressure to the compartment in which the pathology exists; e. g., the tentorium being swung from the lower and posterior border of the falx gives support to the cerebral hemispheres and affords protection to the important structures lying in the subtentorial compartment when there is pronounced increase in intra-cranial pressure.

The space between the dura and the arachnoid is small in the cranial cavity, and normally contains but a few c.c. of cerebro-spinal fluid. In the spinal canal this space is practically obliterated. The pia and arachnoid are very delicate membranes. The pia fits closely to the brain substance and dips into the sulci. It carries the vessels to and from the cortex. The arachnoid fits more loosely and bridges the sulci from summit to summit of the convolutions. As Cushing has graphically described it, the pia fits like a glove, while the arachnoid is like a mitten pulled over the gloved hand.

The space between the pia and the arachnoid is known as the arachnoid or subarachnoid space. It is traversed by delicate bands of connective tissue. At the crest of the convolution the strands are short; in the sulci longer and more loosely arranged. The great bulk of the cerebro-spinal fluid is found in the connective tissue meshwork of this delicate membrane. Henle has described it as the "physiological water-seeking connective tissue." It is in this connective tissue network covering the cord that the fibrinous exudates accumulate in some cases of meningitis and give rise to dry puncture when attempts are made to withdraw the cerebro-spinal fluid.

At the base there are certain large subarachnoid spaces—cisternæ—in the peduncular region and around the pons and medulla. The subarachnoid space is continuous with that of the spinal canal. The dura of the spinal canal is not attached to the vertebræ but hangs as a long elastic tube capable of distension, and, as we shall see, acting as a great protection to the brain in cases of compression.

The arteries distributed to the cortex lie in the pia and at once branch into a fine capillary network. Branching at right angles they produce a rapid fall in blood pressure and slowing of the current, thus insuring good nutrition to the cortical cells. The gray matter is much more abundantly supplied with blood than the white. The arteries going to the cortex anastomose freely. The arteries going to the large basal ganglia, choroid plexus and adjacent structures, are all end arteries and collateral circulation is rarely observed. Each region has its own individual blood supply. The relative advantages and disadvantages of this arrangement are readily apparent. The arteries either have no vaso-motor nerves, or, if they do, the nerves perform a different function from that performed by the vaso-motor nerves of the general circulation. The intra-cranial blood pressure is regulated by gravity and the integrity of the vaso-motor center controlling the systemic circulation.

The veins are large with thin walls easily distended and easily compressed; they have no valves. Certain veins are terminal and softening may occur as readily from the blocking of terminal veins as of terminal arteries. Obstruction to the vein of Galen by thrombosis, as from pressure exerted by a tumor, compressing the vein or the sinus rectus, will cause an acute hydrocephalus with a bloody exudate into the ventricles. Certain trunk veins of the cortex, when obstructed, will cause cerebral softening. The veins of the cortex empty for the most part into the superior longitudinal sinus and against the blood stream. Extending laterally from the sinus proper for one-half to one inch on either side of the great longitudinal fissure are the parasinoidal sinuses or lacuna laterales. It is into these lateral expansions of the sinus that the veins empty. Into these lakes also are thrust the pacchionanian granulations. They are tuft-like processes from the arachnoid covered by delicate endothelium and contain cerebro-spinal fluid. This arrangement makes the attachment of the dura to the brain very close, and the membrane cannot be easily removed.

Injuries and operations in this region are attended by serious hemorrhage, for the dura cannot be separated from the cranium without tearing the emissary veins, and cannot be lifted from the brain without tearing the cerebral veins. The motor centers of the lower extremities are difficult of access on account of being covered by the lacuna laterales. Ligature of the sinuses in this region is difficult for the same reason. There is an emissary vein from the beginning of the lateral sinus at the torcular and another in the mastoid region; between these points operation can be performed without danger of annoying hemorrhage. The vein of Galen empties into the straight sinus, the ophthalmic into the cavernous on either side of the sella turcica. Infection may travel easily from the orbit. This sinus together with the petrosal are very liable to injury in frac-

ture of the base. From the petrosal sinus the blood enters the subdural space and escapes through the ear. Of the vessels supplying the meninges the middle meningeal is the most important from a surgical standpoint, on account of frequent injury in fractures. When an obstruction to the venous outflow occurs there are accessory channels through the posterior condyloidal into the spinal veins, through the emissary veins of the diploe, and through the orbital veins.

The cerebro-spinal fluid is secreted in the ventricles, whether by the ependymal cells or in some other way, is unknown. The amount of fluid varies. Normally there is not a great quantity—about like a synovial fluid in a joint. The subarachnoid spaces over the cortex are small and contain but little fluid. The cisternæ at the base are capable of great distension, but normally do not contain a great deal of fluid. The fluid acts in this location as a water-bed and affords protection to the brain at the time of injury.

CLINICAL OBSERVATIONS IN BRAIN INJURIES.

The symptoms of brain injury are general and focal, subjective and objective. Headache may result from even a slight injury, with possibly subsequent edema producing dural tension or distension. The dura is supplied by the fifth nerve, and is extremely sensitive to pressure. Headache is a common manifestation in brain injury after a day or two, when the mental disturbances have subsided. Other common general symptoms are vertigo and vomiting. In certain cases of cerebral injury after recovery the patient may have vertigo for days or weeks. Vomiting in cases of concussion—so-called—and contusion is also common. Various degrees of mental disturbances are usual manifestations, particularly in serious injuries. These may be delirium and mania, or stupor and coma, depending upon whether there is irritation or paralysis of the cortical centers, because all these symptoms are due to either irritation or paralysis.

There may be either concussion, compression, laceration or contusion, and the symptoms here, as in all other forms of mechanical brain disease, are due to either irritation or to paralysis of the cells. Unconsciousness is nothing more than paralysis of the highly psychic cells, delirium represents irritation of these cells. So that in any case there may be one or both.

Not infrequently there may first be unconsciousness, and with the return of consciousness the patient develops severe headache; there may or may not be delirium. In other instances delirium may develop first, and be followed by unconsciousness. It is not uncommon for patients to be taken to hospitals in an unconscious state, and the diagnosis of alcoholism is made. Many patients with cerebral hemorrhage have been taken to county jails, there merely being sufficient injury to produce irritation of the cortical centers resulting in excitement and delirium—at times maniacal delirium. In such cases if there is a distinct odor of alcohol about the patient, and especially upon the breath, the diagnosis of alcoholism is quite natural. Later the irritation of the cortical cells is succeeded by paralysis, and the patient passes from delirium into more or less profound coma. These, then, are the principal general symptoms, (a) headache, (b) vertigo, (c) vomiting with or without nausea, and (d) mental disturbances.

The focal symptoms, of course, will depend altogether upon location of the injury. If the injury inflicted be in the so-called silent area of the brain, there may be no focal symptoms, although convulsions may occur from even slight irritation over this silent area. If it be in the motor area just in front of the Rolandic fissure, there may be either localized convulsions or paralysis. Injury in the post-central convolution will produce various sensory disturbances. If it be in the temporal lobe, various auditory aphasias may be noted. If in the posterior portion of the third frontal convolution of the left side, motor aphasias will result. If in the region of the calcarine fissure, symptoms referable to vision will occur. If around the angular gyrus, word blindness may be expected. If in the cortex of the first or second convolutions, disturbances of hearing may be observed. Injury in the region of the uncinate gyrus produces disturbances in the sense of smell.

The various focal symptoms will depend largely upon the character of the injury, which may be summarized in the four types already mentioned, viz., (a) laceration, (b) concussion, (c) contusion, and (d) compression. These cover practically every injury, and not infrequently all appear in the same patient. A man who falls from a considerable distance alighting on his head undoubtedly has a certain amount of concussion, if this is to be distinguished as something separate and distinct from contusion, a distinction which is not admitted by some, but generally believed and accepted by the majority. The man will certainly have more or less contusion, he may have laceration, and if he does not have hemorrhage, he will probably have secondary edema with resulting compression.

Concussion is a clinical condition about which a great deal has been written, and about which there has been great diversity of opinion. A few years ago it was recognized as a distinct clinical

entity, not one doubted that there was a general commotion or molecular disturbance in the brain cells produced by the sudden application of violence resulting in very alarming symptoms which sometimes speedily terminated in death. This pathologic concept is no longer admitted. Many contend at the present time that concussion is nothing more nor less than microscopic contusion, i. e., that throughout the brain there will be found evidences of hemorrhage, that if the brain be examined after death indications of extensive injury will be apparent, punctate subpial hemorrhages, contusion, etc. There are certain cases, however, in which even the microscope has been unsuccessful in demonstrating traumatic lesions, athough death had been almost instantaneous. Various theories have been advanced to explain this. For instance, Crile, Cannon and others depend upon the theory of shock. Kocher and several other observers have spoken of increased intra-cranial pressure, the brain being hurled against the opposite side, the cranium bent inward upon one side and being unable to free itself immediately pressure is exerted in certain areas; the blood is thus forced out of it, as always occurs in concussion; anemia of the deeper centers results, and death is almost instantaneous. The centers are so completely overwhelmed by the sudden increase of pressure and sudden anemia that they are paralyzed and unable to recoup, and death immediately supervenes.

The symptoms of concussion are: Slowing of the pulse, slowing of the respiration, a weak pulse, the pupils are either dilated or contracted. In some instances blood pressure may be reduced, and respiration increased; in others the pulse may not show much of a vagal character, although usually slow and often the tension may be higher than normal.

It must be confessed this is a rather confusing list of symptoms. If it be remembered, however, that all the symptoms are due to either irritation or paralysis, the apparent discrepancies may be readily explained. For instance, if there be stimulation of the vasomotor and vagus centers, a slowing of the pulse with increase in the blood pressure may be expected; but if there has been any degree of paralysis, the pulse rate will be increased and blood pressure lowered.

There is sometimes but little difference in degree between the symptoms of concussion and contusion. The symptoms of concussion may exist for a few hours or a day, and the patient then seems improved. The pendulum then swings in the opposite direction, and the unconsciousness is replaced by delirium, the patient suffers from headache and vertigo, the result of secondary edema. Following the headache and vertigo a neurosis may develop and persist for a considerable period of time. In such cases it is only fair to assume that the concussion was either accompanied by or was in the beginning a contusion.

In contusion there is more extensive injury to the brain substance, and the symptoms are more marked. There is also greater danger of more lasting evidence of brain disturbance than in ordinary cases of concussion.

The symptoms of compression, aside from the local symptoms resulting from a depressed fracture or from blood clot over a focal area, are largely those referable to the pulse, the respiration and the state of consciousness. In the milder grades of compression there may be headache, some mental disturbance, slight irritability; while there may be yet no increase in the blood pressure, there is usually a slowing of the pulse rate. The pulse becomes slower, and the slowness persists, and is due to stimulation of the vagus center; in other words, it does not respond as quickly to the various changes in intra-cranial pressure as does the vasomotor center. The respiration is usually slowed somewhat even in the milder cases. The blood pressure at this stage is not increased, which is a point of importance. Sometimes we have depended too much upon the variations in blood pressure as demonstrated by the sphygmomanometer.

It must be remembered that the blood pressure increases only when the compressing force equals or exceeds the blood pressure in the systemic circulation. As compression increases the cerebrospinal fluid escapes, the vascular exits are blocked, the blood cannot get out, and the veins remain distended. When the compression reaches about six per cent of the total volume of the cranial contents, then the ordinary intra-cranial pressure reaches the height of the arterial pressure in the systemic circulation with resulting sudden collapse of the capillaries supplying the brain tissue. That invariably means sudden anemia of the brain. The cerebral anemia stimulates the vaso-motor, the vagus, and the respiratory centers. Hence, as the result of vaso-motor stimulation there is increase in blood pressure of the systemic circulation; stimulation of the vagus center slows the heart action; stimulation of the respiratory center makes the respiration slow; and the vaso-motor center raises the systemic pressure of the circulation to a point where the brain is supplied with arterial blood. If the compressing force stops, the blood pressure will remain there. If, however, the compressing force is from hemorrhage or increasing edema of

the cranial contents, this shortly reaches the height of the increased blood pressure, and cerebral anemia again results; again these centers are stimulated, the pulse becomes slower, the blood pressure mounts higher, and respiration again becomes slower. This process may be repeated time after time until the limit of endurance is reached, the vaso-motor centers are paralyzed as the result of over-stimulation and the increased work placed upon them, blood pressure decreases and the pulse becomes rapid, an indication that the struggle is about to terminate in victory for the compressing force.

The only manifestations observed in the examination of subjects having compression, aside from the general symptoms of headache, vertigo, etc., which may be present, are eye changes. The eye changes at this stage are not in the nature of choked disc; they consist in dilatation of the veins and narrowing of the lumina of the arteries, but not typical choked disc. They are often transitory, and that is the reason that so frequently in examination of the eye-grounds for ocular lesions nothing abnormal is noted, i.e., the change has not persisted for any length of time; in other words, one examination is not sufficient, and frequent examinations must be made or the condition will be overlooked. All the authorities on this subject suggest that the patient be closely watched, because of the short time that the eye shows this symptom, and the rapidity with which it returns to normal.

In the diagnosis of brain lesions, as may be readily seen, it is not an easy matter to always differentiate between concussion, contusion and compression of mild degree. In fact, in the majority of instances some of the symptoms of all three lesions may be present in one individual who has reached the stage of unconsciousness which persists for any great length of time. In a case of compression that has reached an extreme degree, of course the diagnosis is easily made from the pressure symptoms. The presence of increased intra-cranial pressure may sometimes be determined by means of spinal puncture. This procedure is comparatively safe, excepting when the blood pressure is high. If the blood pressure is very high, showing marked increase in the intra-cranial pressure, then spinal puncture and withdrawal of any fluid is dangerous, because of the fact that the medulla is crowded downward into the foramen magnum and fatal anemia may occur from this mechanical condition alone. It should always be undertaken with caution, and the pressure of the cerebro-spinal fluid should be registered before any fluid is withdrawn. This is easily accomplished by attaching a graduated glass tube to a canula inserted into the spinal canal, and noting the height of the fluid in the tube. Where there are manifest symptoms of increased intra-cranial pressure, and the pressure of the cerebro-spinal fluid is low, my rule is invariably not to withdraw any of the cerebro-spinal fluid, because, in my opinion, there is already a partial blocking of the foramen magnum, the cerebro-spinal fluid is not flowing freely into the spinal canal, and even if but a small quantity be removed the vaso-motor centers may be overcome and fatal anemia result.

In many cases of edema of the brain following contusion or concussion, relief is afforded simply by means of spinal puncture alone, but this should never be undertaken when compression is great, or when there is diversity between the intra-cranial pressure and the pressure in the spinal column.

The treatment of so-called concussion of the brain consists in keeping the patient absolutely at rest, cold applications to the head, the use of stimulants when indicated; if blood pressure is low, the administration of remedies which tend to increase the blood pressure; the use of sedatives, such as the bromides, or, what is better in the majority of cases requiring sedation, morphine or heroin. After the acute symptoms have subsided, it is necessary in the majority of cases to combat the sequelæ, which are usually headache and vertigo. Either or both these symptoms may persist for a long time after other evidences of concussion have disappeared.

I now have under observation a man who was rendered unconscious by a severe blow on the head, and who has at no time exhibited any symptoms of compression, as shown by changes in the eye-grounds or increase in blood pressure. The period of unconsciousness lasted twelve hours. Since then he has suffered from headache and intense vertigo; on leaving his bed suddenly he has repeatedly fallen: in walking across the ward in the hospital he invariably stumbles; tinnitus aurium has been another distressing symptom. Careful examination of the ears failed to disclose any evidence of local injury.

The treatment of these sequelæ is very trying. In my experience the best results are obtained by sedatives, good nutrition, freedom from worry, and such remedies and measures as are calculated to improve the general condition of the patient. There is a marked tendency on the part of these patients to develop permanent neuroses. We cannot help but wonder, in this class of cases, just how much and what character of injury the brain sustained at time of the violence, and it is just such cases

that lead us to strongly suspect that concussion, so-called, often means serious brain injury which has not produced the characteristic local or general symptoms which we have been taught to expect.

Contusions and lacerations of the brain are seldom so diagnosed, excepting in cases of compound fracture, gunshot or other penetrating wounds of the cranium. They produce no characteristic symptoms, and are usually found as a part of the pathology in cases where the diagnosis of concussion or compression of the brain has been made.

In compound fractures with extensive laceration of the brain substance, in my opinion, it is always advisable to cleanse the wound as thoroughly as possible, and after having elevated and removed such fragments of bone as necessary to trim away the lacerated brain tissue which manifestly will not survive the injury. In such cases drainage should always be employed. The danger of infection from without at the time or subsequent to the injury is so great as to render drainage imperative.

Compression of the brain may be either localized or general. Depressed fractures of the cranial vault, if in the silent area of the brain, may produce but slight general symptoms. The period of unconsciousness (if such exists) is usually not very long. So slight are the symptoms, and so little alarm do they produce in the minds of the relatives and the patient himself, that very often they are loath to submit to any operative treatment. In these cases the patient should usually be operated upon; the depressed bone elevated, any extra-dural or sub-dural clots removed when possible, and the incision closed without drainage unless the fracture is compound. The remote effects of such injuries when left untreated are familiar to every surgeon. If the patient and those near to him could see the results that so often obtain from failure to operate upon these patients, the number of cases of traumatic epilepsy and traumatic psychoses would be reduced to the minimum.

Localized compression may result without a depressed fracture, or, indeed, without any fracture at all. A linear fracture with extra-dural or sub-dural hemorrhage will produce the same results as a depressed fracture. In such cases, if there are localized symptoms, the treatment is a comparatively simple matter, viz., trephine and remove the clot or as much of it as may be possible. If hemorrhage occurs in the silent area of the brain, and is not sufficiently great to produce general symptoms of compression, then the diagnosis will in all probability not be made, and the lesion will be left for the efforts of nature alone to effect a cure. When the general symptoms or compression make their appearance, we are dealing with a very serious condition and one which requires the employment of our very best judgment. The patient must be constantly watched; any changes in the pulse-rate, respiration, blood pressure, state of consciousness, condition of the fundus of the eye, pressure of the cerebro-spinal fluid, should be carefully noted and correlated. If the compression is of mild degree, the better plan is "to play a waiting game" so far as surgical intervention is concerned. The patient should be treated by cold applications to the head, thorough purgation, and the use of such remedies as will meet special symptoms as they arise. If under this management the compressing force becomes greater, as shown by rise in blood pressure, slowing of the pulse and respiration, changes in the fundus of the eye previously mentioned, and marked increase in pressure of the cerebro-spinal fluid, then careful and serious consideration must be given to surgical measures in order that we may afford relief before the stage is reached in which neither surgery nor any other treatment will avail.

The surgical treatment in these cases consists, where there are no localizing symptoms or signs, in sub-temporal decompression. If the injury to the brain be not too extensive, and if the operation is performed before fatal damage has been done the medullary centers, we may at least hope for a favorable result in a considerable number of instances. It is a mistake, however, to postpone operation until development of positive signs of paralysis or beginning paralysis of the medullary centers, as shown by increase in the pulse-rate, lowering of the blood pressure, etc. Operation then can only add to the shock and hasten the fatal result.

No doubt in many of these cases, were we able to determine it, there is simple edema of the brain resulting from contusion, and in such instances the patient would probably be relieved by spinal puncture alone. Unfortunately we have no sure means of determining when edema alone exists; moreover, we have been taught, and as a result of our teaching, we fear to employ lumbar puncture on the mere manifest signs of increased intra-cranial pressure. Personally, and as before stated, I believe if there exists the proper relationship or ratio between intracranial pressure and the pressure of the cerebro-spinal fluid, lumbar puncture is comparatively safe.

A great many of these cases are attended by fracture of the base of the skull. While the fracture in itself amounts to little, the force which is sufficient to produce the fracture often causes

serious injury to the brain itself. Again, and as before noted, fracture of the base is frequently associated with laceration of the petrosal and cavernous sinuses on account of the intimate attachment of the dura to the surface of the bone. This also opens an avenue for infection when the line of fracture extends into the middle ear, the pharynx, or the posterior nares.

I am convinced that many patients with fracture of the base recover without operative treatment. I am of the opinion that fractures of the base are not entirely hopeless as we were formerly taught, and I am not one who believes that if the patient gets well he did not have a fracture of the base however much the symptoms may have indicated it. I am sure that I have seen several such patients recover. The percentage of cures will be greater if we do a decompression operation and relieve to an extent at least the threatened anemia of the bulbar centers.

DEFORMITIES OF THE NASAL SEPTUM. THEIR CORRECTION BY AN IMPROVED TECHNIC FOR SUBMUCOUS RESECTION.

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Until rather recently, probably no operation upon the nose and throat has met with more criticism of the medical profession than submucous resection of the nasal septum. This criticism in many instances was, and still is, justifiable, inasmuch as frequently the operation has been performed without any attempt to arrive at clear and definite indications. In general, three well-defined indicatons for performing a submucous resection upon a pathologically deformed septum are recognizable, each pointing to a rather distinct type of deformity. The general indications are defective breathing, defective drainage and reflex symptoms from pressure upon or from adjacent structures; one or more of these indications may be present. Needless to remark, all other causes, intranasal and post nasal, such as hypertrophied inferior turbinates, hypertrophied posterior tips of inferior turbinates, adenoids, polyps, etc., must first be excluded. Not infrequently I have seen cases in which the operation for relief of deflection of the septum was entirely successful from a cosmetic standpoint, and yet the patient had obtained little or no relief, owing to a failure to recognize and remove a rather large adenoid. Likewise, however perfect the result may be from the standpoint of correction of the deformity, one recognizes the futility of the operation unless, at the time of the resection, narrowing of the introitus of the nose from projection of alar cartilage or dislocation of septal cartilage is first remedied. Hypertrophy of the inferior turbinate, frequently seen upon the side of the concavity of the septum, and causing defective nasal breathing and drainage, often spontaneously regresses to the normal upon correction of the deformity of the septum, the hypertrophy in such instances simply being of a compensatory variety—nature's attempt to fill in the abnormally large space.

Various classifications of septal deformities are to be found in all the modern text books on rhinology. None to my mind is better than that of F. O. Lewis, as by means of this classification a definite conception of the indications for submucous resection is obtained. First, there is the deviation of the quadrilateral cartilage, caused usually by an injury, in which the cartilage has been fractured or dislocated in such manner that the convexity of the deformity obstructs one side of the nose; the free border of the cartilage projecting into the opposite side with perhaps a compensatory hypertrophy of the inferior turbinate. To correct this the entire cartilage has to be removed, especially if there is a twisting of the tip of the nose. The second type consists of a deflection of both the cartilaginous and the bony septum located usually near the floor of the nose and extending from within the vestibule almost to the posterior nares, impinging against the inferior turbinate, interfering with drainage and ventilation and associated with Eustachian catarrh and subsequently middle-ear deafness. Thirdly, deflection of the vertical plate of the ethmoid, impinging against the middle turbinate, which may be hyperplastic, giving rise to reflex symptoms such as asthma, headache, neuralgic pains about the face, cough. Interference with drainage from the frontal, anterior ethmoid and maxillary sinuses may result from this type. Not infrequently all three types may be present in the same case. The last indication *per se* does not warrant the performance of a submucous resection unless, at the same time, a deformity of the first or second type is present. If a deformity of the third type alone is present the reflex symptoms to which it gives rise may sometimes be eradicated by the removal of the hyperplastic anterior tip of the middle turbinate upon the side of the convexity.

Preliminary to operation every precaution against possible infection should be employed. Thorough cleansing of the face with soap and water should be insisted upon, particular attention being given to the nose and especially to the introitus. Tincture of iodine is applied to the area in the region of the

nares, followed by alcohol and sterile gauze 4" x 4" with an opening for the nose is applied over face, and a sterile towel or cap covers the scalp. Nothing to my mind conduces to the greater ease and confidence of the patient than a hypodermatic injection of morphine ¼ gr. with atropine 1/150 gr. one-half hour before the operation. The question of the position of the patient is of the utmost importance. Until the past two years it had been my custom to have the patient in the sitting position—this being the position used by a majority of operators at the present time—and as a result many of my patients would have fainting attacks, necessitating frequent interruptions of the operation, to say nothing of the harmful or even dangerous possibilities therefrom. This annoying and rather dangerous condition can be almost entirely avoided by having the patient flat upon the operating table, the head being but slightly elevated. This position has the further advantage that it affords a better access to the floor of the nose, the region in which most of the difficulties of a resection are usually found. To one who has been in the habit of having the patient in the sitting position while operating, there will at first be considerable difficulty in acquiring the necessary dexterity, in the supine position, but the advantages soon become apparent after a few trials.

While the operation may be performed under general anesthesia, I have a decided preference for local anesthesia, as the field of operation can not only be rendered absolutely painless but also hemostasis is far better. The proper application of cocain and adrenalin is of first importance in obtaining a painless and practically bloodless operation. The methods of cocainization which I employ is as follows: a cotton applicator moistened with adrenalin 1-1000 is dipped into powdered cocain hydrochloride, and by means of gentle friction, is applied over the entire septum and floor of the nose, especial attention being directed to the area of the septum directly opposite the anterior end of the middle turbinate; this area is ordinarily quite sensitive at first. By renewing the application three or four times, complete anesthesia results in about ten minutes. I have never seen any systemic effects from the application of pure cocain in this manner. Undoubtedly the use of adrenalin with powdered cocain confines its action to the area of application. Instead of this method of producing local anesthesia one may pack the nose with three or four pledgets of cotton saturated with 10 per cent. cocain solution in 1-1000 adrenalin. This is allowed to remain for half an hour.

Before beginning the incision an injection of ½ per cent. solution of novocaine containing six drops of adrenalin, 1-1000, to the half ounce, is made into the integument of the vestibule on each side, this area not having been affected by the local applications; furthermore, the injected solution diffuses itself between perichondrium and cartilage, thus rendering the elevation of the perichondrium less difficult.

An incision is made as near as possible to the entrance of the vestibule of the nose, beginning above and with the convexity directed to the free margin of the cartilaginous septum, and is extended for a short distance (¼" to ½") along the floor of the nose. By prolonging the incision along the floor the probability of tearing the muco-perichondrium is considerably lessened when elevation of the membrane is begun. Beginning the separation with a sharp elevator at the upper end of the incision, where the perichondrium is rather loosely attached, this is continued downward to and along the floor. If the incision has been properly made through the perichondrium, there will be no difficulty in continuing the seperation. Except for the elevation of the perichondrium thus far described, I have been in the habit of completing the separation with a dull, flat elevator, keeping the instrument in close contact with the cartilage throughout. Nothing is to be gained by repeatedly removing the separator while in the process of elevating the mucous membrane.

Having detached the muco-perichondrium on one side, an incision is made through the cartilage following the line of the original incision; the muco-perichondrium on the opposide side is then detached, following the method above described. As much as possible of the cartilage is removed with one sweep of a Ballenger swivel knife. In order to maintain the proper support of the nose ¼" of septal cartilage between the lateral cartilages is allowed to remain. With a Demarast bone forceps deflected portions of the vomer are carefully removed, always being first certain of the complete separation of the overlying mucous membrane. Finally, careful attention should be given the floor of the nose for in this location especially spurs and deflection are usually present. It is my custom to continue, if necessary, the separation of the mucous membrane along the floor with a sharp elevator, then using the Demarast forcepts with a rocking lateral motion, ordinarily no difficulty arises in removing the nasal spine *in toto*. If some still remains the same procedure is continued. In some instances it may be necessary to first loosen the spine anteriorly with chisel and hammer.

Having removed all of the deflected septum, sol.

adrenalin, 1-1000, is thoroughly applied between the flaps of muco-perichondrium, spicules of cartilage and bone are removed and the entire area swabbed out with tincture of iodine. The flaps are then allowed to approximate and are maintained in position by carefully packing each nasal cavity. I remove the packing at the end of the twelve hours. No applications, irrigation, sprays or manipulations of any kind are made immediately after the removal of the packing and for three days following. At the expiration of this period I apply adrenalin solution, 1-300, spray the nose with Dobell's solution and prescribe the latter for the patient's use at home. By strict avoidance of any manipulations in the nose for the first few days, the possibility of infections, such as septal abcess, sloughing of the flaps, etc., can be avoided. Infections have been further reduced by saturating the strips of gauze, before packing, in the following mixture:

Iodoform	℥ii
Glycerine:	
Distilled water	aa ℥ii
Sublimate solution (1-3000)	℥ss

Pyramidon, gr. 5 with caffein gr. ½ relieve the distressing headache which often follows the operation and by repeating this once four hours later, if necessary, I have been able to render these patients practically free from discomfort. In a number of instances where conditions were favorable for keeping the patient under constant observation, I have refrained from packing the nose. The objection to this that hematoma between the septal flaps may occur, has been overcome by an antero-posterior incision of the flap on the side through which the original incision had been made, the line of incision being made along the floor, thus allowing for proper drainage. I have not had any cases of post-operative hemorrhage by using this method; after a few days applications of argyrol 25% are made to both nasal cavities on alternate days for two or three weeks.

SUMMARY.

1. The type of septal deformity and the indications for performing a submucous resection should be thoroughly considered before deciding to operate.

2. Adenoids and narrowing of the nares should receive proper operative attention in order to obtain the fullest benefits from submucous resection.

3. The supine position of the patient, the head slightly elevated, is the ideal position while operating. Shock is eliminated, better access to the floor of the nose is obtained.

4. Under favorable conditions, packing of the nose may be dispensed with after the operation.

5. Post-operative manipulations in the nose should be avoided for a few days so as to minimize the possibility of infection.

17 EAST 38TH STREET.

NOTES ON MINOR EYE INJURIES.*

JOHN R. WRIGHT, M.D.,
LOUISVILLE, KY.

The most trivial injury to the eye, through neglect, ignorance or mismanagement, may result in total loss of vision in one or both eyes, disfigurement or even death. In all cases of severe injury there will be diminution of the earning ability of the individual, with pain and suffering entirely out of proportion to the same character of injury inflicted upon other structures of the body. The treatment of a wounded eye should be conservative from the first, to retain as much vision as possible, to preserve the cosmetics of the organ, and in some instances even to save the life as well as to relieve the agony of the injured individual.

With the foregoing in view we must consider, first, those methods which will give the best results as regards vision, and second, as regards the appearance of the globe and its surroundings, always bearing in mind the dreaded possibility of sympathetic ophthalmia in the other eye, and also remembering the operation of enucleation or its substitutes with which to combat this possibility.

As a rule an injury to the eye immediately incapacitates the individual from pursuing his employment of pleasure, and he may be so blinded as to require assistance in getting to a place of safety. Wurdemann says the public should be taught that as a rule "first aid" to injured eyes consists in letting them alone, other than to apply a clean cloth bandage, and to immediately seek the aid of the physician; excepting where large quantities of foreign material, such as sand, dirt, of corrosive substances (lime or other chemical) enter the eye, in which event free douching with clear water is required. The application of such household remedies as tea, milk, honey, urine, beefsteak, bread-and-milk poultices, chamomile, sage-tea, etc., should be forbidden, as they act only as a poultice and thus assist in the growth of germs. The eye is in no wise a boil to be "drawn out."

On account of the pain, photophobia and lachrymation it is generally necessary to apply a local anesthetic to the injured eye before a satisfactory examination can be made. For this purpose a solution of two to four per cent. cocaine or two per cent. eucaine may be used. In no case should a local anesthetic, such as cocaine, be entrusted to the

*Read before the West End Medical Society, of Louisville, Ky. May 9, 1916.

patient to be used for the relief of pain, the latter being nature's warning of danger and her call for relief. Cocaine frequently repeated causes tissue damage by depleting the blood supply, with resulting dryness and exfoliation of the ocular conjunctiva.

Dionin is a true analgesic and may be freely used in a five per cent. solution. After the first few applications the conjunctival edema which it causes does not recur, but the anelgesic effect remains unimpaired and more or less relief for several hours is thus afforded. Rest of the ciliary muscles and iris by the use of cycloplegics and mydriatics is helpful in preventing pain. In exceptional cases morphine may be administered hypodermatically.

The therapy of the wounded eye is based upon surgical principles from beginning to end, and the watchword is asepsis. The anti-sepsis of the wound is best achieved with a ten per cent. silvol or a twenty-five per cent. argyrol solution frequently repeated, and continued so long as there is any evidence of an abrasion.

Injuries to the conjunctiva should be treated as strictly surgical lesions. Care should be exercised to prevent an excessive amount of scar tissue. Another point never to be overlooked is adhesion of the palpebral to the ocular conjunctiva. This is a complication frequently seen and one which may give the physician a considerable amount of trouble.

Particles of coal, cinders and pieces of vegetable matter rarely require instrumental means of removal; but particles of stone, emery and metal may be driven into the conjunctiva with considerable force, and it is sometimes necessary to literally "dig them out." A cataract knife is a splendid instrument for that purpose.

Blasting and dynamite explosions may cause the impaction of a large number of foreign bodies in the conjunctiva. Removal of the foreign bodies is not all that is required; in many cases it is necessary to excise a portion of the conjunctiva with forceps and scissors to remove stains that are left. Foreign bodies that are too small or too transparent to be readily observed may be removed with a soft cotton brush.

Foreign bodies upon or within the cornea are frequently seen, and should be removed under a local anesthetic so as to lessen the danger of doing more damage to the cornea by the operation than is done by the foreign body. Workmen in shops frequently become quite adept in removing foreign bodies from the cornea. In many instances, however, badly infected eyes result from the use of non-sterilized pins, knife blades, horseshoe nails, etc., and the non-use of antiseptics. The worst cases with which we have to deal are those that have been unskillfully handled by the patient's associates at the shop or on the road, or by some physician whose eyesight and manual dexterity are not sufficient to enable him to remove the foreign body without causing more damage to the eye than probably would have resulted had it been left alone.

In the case of deeply penetrating objects, such as metals, splinters, particles of sand, stone, etc., special care must be taken to avoid puncture of the cornea. Infection may cause corneal ulcer, iritis, and numerous other dangerous complications. The diagnosis is generally made by the patient, but much depends upon the physician as to what complications may ensue.

This paper is limited to the care and treatment of minor external injuries to the eye, and must not be interpreted to refer to the more serious injuries, such as punctures of the anterior or vitreous chambers, dislocation of the crystalline lens, detachment of the retina, and many others of dangerous nature.

The locating of very small foreign bodies on the cornea is frequently a tedious proposition, requiring acute eyesight, a proper magnifying glass, and a strong light. After the diagnosis has been made, under local anesthesia if necessary, the eye should be well irrigated with a reliable antiseptic and again cocainized. The foreign body is then removed with as little traumatism as possible. If there is much ciliary inflammation the use of atropine solution, one grain to two ounces, is advisable, and solution of silvol or argyrol should be used in the eye at least every hour. Extreme heat or cold applied to the eye for fifteen or twenty minutes will frequently give much relief.

The patient should be kept under observation as long as there remains the least sign of abrasion or ciliary congestion, and shade glasses should be worn. In many instances there will be found considerable scar tissue which it is necessary to absorb by the use of dionin, yellow oxide of mercury ointment, and massage with oil. This process is usually slow and tedious, but in many cases good results are secured.

While Berger's binocular loupe with large plus lens have been found of great service in locating small foreign bodies, yet it is necessary at times to use the ophthalmoscope.

The care of the eye following a lime burn is very tedious and not to be entrusted to the patient. Within twenty-four hours a synechia may be formed that will prove very annoying. Use weak acid at first, and be sure that the adhesions are separated several times each day.

CARBOHYDRATE FEEDING IN SURGICAL CASES.

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In a series of eighty laparotomies, thirty-four with and forty-six without special attention to diet before and after operation, the post-operative benefits derived in the cases with special diet was very marked. These benefits consisted of less abdominal distention, often no abnormal gas formation, more perfect healing, and markedly less distress both mental and physical.

The 34 cases selected for special diet included 7 gastro-enterostomies, 1 partial resection of the stomach, 3 resections of the intestines, 10 appendicectomies, 7 gall-bladder cases, 2 Cesarian sections and 4 operations upon the uterus and adnexa. In all cases there was marked improvement over similar cases on ordinary hospital diet.

Nearly all who observe surgical cases are impressed with the fact in two patients with the same disease, e. g., chronic appendicitis, on whom similar operations are performed and in whom the previous physical conditions are to all observances similar, that one case goes on with practically no post-operative distress and the other suffers very considerably. Why does this occur? Why do not all cases proceed smoothly? It has been attributed to differences of nervous stability on the part of the patient, to psychic shock, etc. Yet in cases where the psychic shock is admittedly great, as in major operations with local anesthesia, we have seen smooth recoveries. The general anesthetic, ether or chloroform, certainly accounts for much of the post-operative distress. Stomach washing helps this; but still there is much to be desired.

In preparing a patient for operation it has always been the custom to permit him to eat about anything desired up to the day previous to operation and then by purges and enemas to empty the intestinal tract. After the operation the patient is usually too nauseated to desire food. For the first few days he receives a little orange juice or broth or buttermilk, if he likes it, or almost any "liquid diet." This means that he is practically on a "starvation diet" for three or four days. We are told that patients "usually feel better after the bowels move," but we all know that frequently they do not feel better.

After most laparotomies the patient's digestive apparatus is disordered and he does not absorb an over-abundance of nutriment. On questioning in 80 laparotomy cases, I found that they have been eating those things which they believed nutritious, as beef tea, milk, eggs, a little meat or fish and usually very small quantities of food rich in carbohydrates. This means that most of the carbohydrates ingested are used up within a few hours and very little stored up in the liver as glycogen. Therefore during these days after operation, these patients live on their own protein bodies and fats. It has been repeatedly shown that on a rich protein diet, there is generated a great excess of decomposition products, harmful to the body unless rendered inocuous by the liver. This is evidenced by the increased excretion of acetone and diacetic acid in the urine during starvation. (Emerson.)

A casual examination shows, as Cushny points out, that almost all the narcotics are methane (CH_4) derivatives, and I may add that acetone and diacetic acid are also such. Now, in diabetes —to digress for a moment—the onset of danger is usually foretold by the increase of acetone and diacetic acid, and the coma is, we are told, an acidosis due to diacetic acid, "the mother substance of acetone." When the strict dietary treatment of diabetes was first practiced the clinicians were surprised at the number of cases of coma, i. e., they noted that with the withdrawal of carbohydrates for a considerable time, permitting a diet rich in proteins, the patients' condition is worse. They develop an acidosis. Clinicians found that to return for a short time to carbohydrate food frequently averted coma.

Is it not reasonable to expect when we are using considerable ether, a product closely related to acetone (ether $C_2H_5—C_2H_5=O$; acetone $CH_3—CH_3=CO$), a methane derivative as both are, that we might assist nature in preventing an acidosis or in lessening it, by the use of a carbohydrate diet for a few days before and after an operation? That there is an acidosis after chloroform anesthesia has been proven by Von Jaksch, by increase of acetone in the urine. In 10 cases of ether anesthesia, I found acetone present in the urine for 24 hours following. Von Jaksch stated that acetone is increased whenever the carbohydrates of the diet are eliminated. Emerson stated that the amount of acetone excreted may be reduced by adding carbohydrate to the food. That this and other by-products formed in the body of patients on a rich protein diet (almost a starvation diet) following an operation, and especially when a general anesthetic is used, are responsible for many of the discomforts and for faulty wound healing, I firmly believe. I also believe that by proper regulation of the diet before and after operation, we can greatly

mitigate the suffering of our patients and lessen the period of disability.

The special attention to diet consists in elimination from it meat and eggs for three or four days previous to operation and after operation using a solution of malt sugar or 20% dextri-maltose, 5 ounces per rectum every 4 hours, if awake, for three days. In 7 cases of pyloric stenosis 20% solution of dextri-maltose, was used per rectum, 5 ounces every 4 hours for three days prior and four days subsequent to operation.

The post-operative results follow:

Of the 34 test cases, 7 gall-bladder cases were drained, 26 had primary union, one had serum under the skin, which absorbed *without suppuration. All clean cases healed clean.*

There were no disagreeable symptoms, as nervous excitability, or gas distention and no considerable degree of nausea or vomiting.

Of the 46 control cases of similar nature, 6 gall-bladder cases were drained, 3 healed by primary union, 6 had serous exudate which absorbed without suppuration, 3 became infected. Therefore 7.5% became infected of cases, primarily clean. In other words, their resistance was below normal. Fully 75% had considerable gas distention, an equal number were anxious and excited, 85% vomited or were considerably nauseated.

The only difference between the test cases and the controls was in the administration of an excess of carbohydrates before and after operation. This, whether through some affinity to the noxious substances generated or by supplying a readily available source of energy to the body and especially to the purifying plant of the body—the liver, seems to tip the balance in favor of the patient.

TUBERCULOSIS OF THE KIDNEY.

An early diagnosis is of first importance, and in no condition is a careful history taking more essential than in tuberculosis of the kidney. Should a patient present himself with a history of frequent and painful urination, loss of weight, vague pains in the back, digestive disturbances and blood or pus in the urine, we should first disprove tuberculosis of the kidney before assuming it to be absent. If the tubercle bacilli are found, we have ratified our suspicions, and then it would only remain to determine the extent of the involvement, and treatment to be given. If albumin is present without any other satisfactory reason, and there are present other signs which point to tuberculosis of the kidney, we are well on the road to a correct diagnosis, especially if pus is found.—PAUL W. HOWLE, in *The Virginia Medical Semi-Monthly.*

THE INJECTION OF METHYLENE BLUE TO FACILITATE THE SURGICAL TREATMENT OF CHRONIC DACRYOCYSTITIS.*

JOHN GUTTMAN, M.D.,
NEW YORK CITY.

Diseases of the tear passages are on the borderline of affections of the eye and of the nose. The eye is the organ most commonly involved in this disease because the presence of a sac filled with pus containing virulent micro-organisms is a constant menace to the cornea and conjunctiva by inducing conjunctivitis, epiphora and ulcus corneæ. On the other hand, the nose, with its accessory sinuses, is most frequently the etiological factor in diseases of the tear passages.

In Kuhnt's experience (*International Larygological Congress,* Vienna, 1908), diseases of the lacrimal passages have their origin in the nose in 95 per cent. of the cases.

A contention has lately arisen between the nose and the eye specialists as to whose domain the treatment of this disease belongs. As a matter of experience, we know that when numerous remedies have been offered for the treatment of a disease, none of them, as a rule, is perfectly satisfactory. The nihilistic school treated conjunctivitis and epiphora, the sequelæ of this affection symptomatically, with astringents, or with injections of nitrate of silver to the tear canals and tear sac. Others advocate the use of probes for the dilatation of the tear passages. This method of treatment in some cases produces more harm than good; it is very painful, it lasts very long (many months or even years), and sometimes by making false passages one is liable to bring on a condition much worse than the original disease.

For stenosis of the tear passages beyond the lacrimal sac, Toti, Polyak, West, Halle and others devised an intranasal operation for the artificial drainage of the lacrimal sac. This operation can never become very popular for the following reasons: 1. It is quite a difficult operation, and in a naris narrowed by a deviation of the septum, this deviation must first be corrected by a submucous resection before the intranasal operation on the lacrimal sac can be undertaken. 2. The artificial communication between the lacrimal sac and the nose often closes prematurely and the result of the operation becomes nil. 3. It leaves the lacrimal sac, which is the source of great danger to the eye, on account of the virulent micro-organisms contained

*Read before the Ophthalmological Section of the N. Y. Academy of Medicine, May 15, 1916.

therein, *in situ*. The extirpation of the lacrimal sac through an external wound is therefore the favorite method of treatment by most ophthalmologists. This method practically leaves no scar, it brings about the quickest cure, it eliminates the most dangerous source of infection, the lacrimal sac. The disadvantages of this operation, like those of all others, are, first, that there are some cases where the epiphora remains and an extirpation of the lacrimal gland becomes necessary, and, second, the operation is rather a difficult one in the hands of operators who may not be very skilful or whose experience in this direction may be limited.

To differentiate the thin reddish walls of the lacrimal sac and to reach it in the short deep tunnel-like wound, without deviating to the right or to the left, that is, either towards the nose or towards the orbit, is a very difficult task. This latter deviation towards the orbit may become a source of a severely annoying hemorrhage, to check which will necessitate considerable time, and in rare cases it may cause intraorbital abscess with all its possible sequelae.

In order to overcome this difficulty of the operation and to make the lacrimal sac easily recognizable, numerous devices have been suggested. Some perform the operation in two sittings; at the first one the opening into the sac is made and the cavity packed with a piece of gauze in order to stop the hemorrhage; at the second, twenty-four hours later, the cautery is applied. Surely, a very unpleasant interruption. Some introduce a probe into the lacrimal sac in order to make it more distinguishable. This is not a very commendable procedure, because the canaliculis must be slit in order to introduce the probe, and because the probe in the wound takes away valuable space which is necessary for the proper shelling out of the lacrimal sac. Some advised the use of plaster of Paris or paraffin. The disadvantages of this procedure are, that the canaliculi are very narrow, the plaster of Paris must be very thin and watery, and it takes a long time for the water to evaporate; therefore this method has hardly any followers. In one case I used paraffin with results which were far from satisfactory. On account of the narrow canaliculi the paraffin must be used in a hot liquid form. A hot fluid in the vicinity of the eyeball is very dangerous, because by some spilling of the paraffin the eyeball may be burned. The paraffin occludes the tear passages, and in my case, although I curetted the lacrimal canal at the end of the operation, the wound did not heal by primary union, but suppurated for several weeks. I had to perform a secondary operation to remove the hardened paraffin from the wound as well as from the lacrimal canal, and after this it took two weeks for the wound to heal.

In order to avoid all these difficulties an injection of methylene blue with a lacrimal syringe into the lacrimal sac will greatly facilitate this operation. After the skin, superficial fascia and orbicularis muscle fibers are cut through the distinctly blue-colored sac shines through the deep fascia and all there is to do is to keep close to the blue walls of the sac and to avoid prematurely injuring its walls. When the sac is incised for the purpose of extirpation the methylene blue fills the wound, but at this stage of the operation when the sac is held fast by the forceps not much damage can be done, because the sac has been found and the aseptic methylene blue can do no harm to the wound.

60 ST. MARKS PLACE.

A PROSTHETIC APPLIANCE DEVISED AND CONSTRUCTED BY DR. J. PORTER MICHAELS OF PARIS, TO REPLACE A NECROSED SHOULDER JOINT, REMOVED BY DR. PÉAN.*

E. A. BOGUE, M.D.,
NEW YORK.

It is a pleasure to comply with the chairman's request, and to present an appliance made many years ago by Dr. J. Porter Michaels, a dentist of Paris, for the restoration of the left shoulder-joint of Jules Pedoux, twenty-seven years old, a baker of Paris.

Pedoux was suffering from tubercular osseous necrosis. The operation was a resection of the humerus, about half its length, performed at the International Hospital, Rue de la Santé, Paris, by Dr. Péan, March 11, 1893. On November 8, 1893, the patient was doing well, and in the summer of 1894, about a year and a half after the insertion of this prosthetic restoration, which was called "osteo-brachiale-plastic," the patient drew the corks from bottles of beer and poured out the contents, handing us the glasses, and also took dinner, using a knife and fork without attracting any attention.

The prosthetic piece was made of black rubber, vulcanized and mounted with platinum. This was attached with screws to the humerus while the head of the apparatus, having almost all of the movements of the ball and socket joint, was attached by platinum screws to the scapula, the capsular liga-

*Presented, by request, before the Surgical Section of the N. Y. Academy of Medicine.

ment being held in place by two platinum loops. The ingenuity exhibited in devising and executing such an apparatus is marvelous, for it gave almost exactly and without apparent friction all the move-

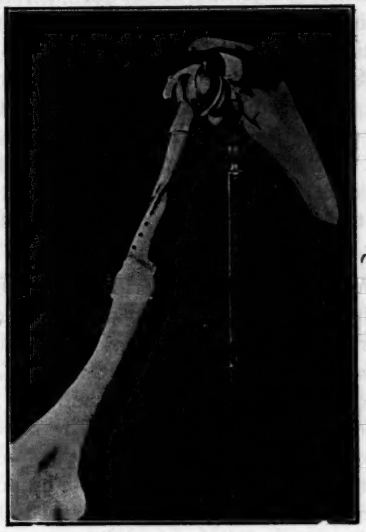

Fig. 1.

ments of the shoulder joint, up and down, backward and forward, and sideways as well. The apparatus was inserted within the periosteum and the proliferation of bone was later observed by means

Fig. 2.

of the then recently discovered *x*-ray until it seemed desirable to remove the apparatus lest it should hinder complete recovery.

Dr. Péan removed the appliance and closed the wound, after which I never saw the patient, but I have been told that the deposition of bone continued until there was a fair restoration of the parts, with, however, a little shortening. The wonder is that so large a mass of extraneous matter could have been tolerated for so long a time beneath the periosteum.

There were several small abscesses that supervened and had to be opened. The general health

Fig. 3.

of the patient improved after the operation and remained good until I left.

I present this unique and ingenious prosthesis, not as an example to be emulated, but rather as a surgical curiosity of historical interest, demonstrating the occasional long toleration by the tissues of a large foreign body.

FRACTURE OF THE INTERNAL CONDYLE OF THE HUMERUS.

The line of fracture of the internal condyle runs into the joint to the trochlear surface of the humerus. The cause is nearly always direct violence as a fall on the condyle. This fragment of the condyle, accompanied by the ulna, goes upward and backward, and when the forearm is extended the olecranon projects posteriorly, and the lower end of the humerus can be felt in front. Crepitus and mobility can be detected by flexing and extending the forearm. Other symptoms that are pronounced are the space between the condyles is wider than normal, the forearm takes a bend towards the ulna side, because the broken condyle ascends, producing loss of "carrying function," or the deformity known as gunstock deformity.—DUNCAN EVE in *The Southern Practitioner.*

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WALTER M. BRICKNER, M.D., Editor
NEW YORK, AUGUST, 1916.

THE ORGANIZATION OF MEDICAL PREPAREDNESS.

Large, indeed, is the number of American physicians available for volunteer service in case of war; and loyally would that service be rendered. Vast, indeed, are the resources, actual and potential, of medical equipment and supplies that could be called upon; and many are the generous purses that would supply them. But just who, what, where are these resources of personnel and materiel; how nearly are they organized and ready; to what extent are our Army and Navy Departments supplied with detailed information concerning the special qualifications of each available civilian physician, the equipment of various hospitals, the preparedness of hospital "units" and the equipment of volunteer organizations, so that they may be called upon, as needed, and utilized where their efficiency will be maximum?

In two important measures the federal government has, to be sure, made distinct, but still insufficient, advances in medical preparedness for the national defense:

First, the creation of the Medical Reserve Corps of the Army and of the Navy. In these corps, large but not yet large enough, are many young physicians whose services would much be needed (in field, evacuation and base hospitals, in ambulance companies, recruiting depots and mobilization camps), and a large proportion of the eminent surgeons and internists of the country (on whom, no doubt, the direction of base hospitals would devolve). Many of the Army Medical Reserve Corps have been actively interested and have taken advantage of the opportunities for instruction by correspondence course and at camps. This corps, as such, goes out of existence next year, but it will be continued, essentially, as the Medical Department of the Officers Reserve Corps that is to be created, and in which, it is to be hoped, a still larger number of physicians will seek commissions. Indeed, it seems reasonable to believe that the Medical Reserve Corps was the inspiration for the formation also of a reserve corps of officers of the line.

Second, in 1911 the American Red Cross was made the agency for the formation and equipment of reserve medical organizations for the army and navy, each unit thus organized to become a part of the medical department of the military forces if called upon for service in war. The national Red Cross has been gradually developing its work along these lines and recently various state branches have been very active in securing the money and the personnel for the establishment of "base hospital units" and ambulance corps. In this effort, made with the cooperation and under the direction of Col. Jefferson R. Kean, U. S. A., as director-general of medical relief of the American Red Cross, the society has thus far been very successful, and it may be hoped that in a short time several base hospital units will be quite prepared for service. Few, if any of them, however, are at present as well organized in either personnel or equipment as the newspapers have made it appear. There are, too, many points to be satisfactorily settled, concerning length of service and the relations of the "base hospital unit" to the parent hospital from which its staff is recruited, before the establishment of these units can be regarded as more than mere paper organizations. At present, enrollment in these units is for two years' service, a period that many who have volunteered in the units are unwilling to pledge. Very few physicians indeed can abandon their practice for two years without financial and professional ruin. It is a sacrifice that should not be asked of them unless the country were actually invaded by a large force. Much more reasonable and more practical, it seems to us, would be a service of about six months, the parent hospital maintaining the personnel of the unit by the rotation of acceptable volunteers from its staff. Such a system obtains, we are told, among the medical volunteers in the European Red Cross hospitals.

The establishment of a reserve body of medical

officers and the organization by the Red Cross of the personnel and equipment of medical relief such as would be needed in war, seem to afford a substantial basis of medical preparedness for national defense. But a much more thorough organization of the medical resources of the country is possible, and the medical needs of the present war have clearly indicated that it is very desirable. The value of a complete inventory of such resources appears to have been appreciated and the suggestion was communicated to some civilian physicians. As a result of this the presidents of the American Medical Association, the American Surgical Association, the Congress of American Physicians and Surgeons, the Clinical Congress of Surgeons of North America, and the American College of Surgeons have jointly formed a Committee of American Physicians on Medical Preparedness to "cooperate in developing the civilian and reserve medical resources of the country to the highest point of efficiency." Representative sub-committees have been appointed in all the States and Territories.

An Executive Committee of ten, of which that master organizer, Wm. J. Mayo, is chairman, in a letter addressed to President Wilson in April thus expressed the purpose for which this Committee of American Physicians tendered their services:

"1. To establish, through the membership of the above named medical organizations and their affiliations with local medical societies of the States and territories, an organization that would be in a position to make a comprehensive survey of the medical resources of the country.

"2. To make a complete invoice of such resources available in peace and in the emergency of war. This invoice would include not only the names of men available for field or home duty who are trained in the specialties of medicine, surgery, and sanitation, but it would also include in minute detail for each community the equipment of the institutions with which these men are connected, such as hospital facilities, buildings available for hospital use, facilities for transporting wounded men, food supply and drug supply on hand and available lists of trained nurses and other persons essential for hospital work, etc., etc.

"3. To aid in the care of the sick and wounded and the elimination of preventable diseases."

In his prompt reply President Wilson stated that the Secretaries of War and the Navy had directed the preparation of a plan for accepting the services of the committee.

With a large reserve of medical officers for the army and the navy, a thorough organization and equipment of military units by the Red Cross, a revivified and federalized militia and an alert Committee of American Physicians cooperating with these bodies, with thousands of self-sacrificing and patriotic doctors and nurses still unenrolled but eager to serve, and with an awakened and enlightened public, medical preparedness ought soon to be more than a slogan! Even now we may at least feel sure that the disgraceful fiasco of the Spanish-American War will not be repeated. W. M. B.

THE NATIONAL BOARD OF MEDICAL EXAMINERS.

The labors of the lamented Wm. L. Rodman in establishing a national board of medical examiners bid fair to bear fruit. The Board, a voluntary organization, selected from the Army, Navy and Public Health Services, the Federation of State Examining Boards, and the profession at large, will hold its first examination in the Army Medical Museum at Washington, beginning October 16th next.

The examination will cover all the branches of medicine. For admission to it are required evidence of the completion of four years high school study and two years of satisfactory college work, graduation from a Class A medical school, and one year's service in a satisfactory hospital or laboratory. A registration fee of $5 is also required.*

A certificate granted by this board is not a license to practice medicine nor does it afford any exemption from the legal requirements of any State or territory. But it seems likely that the time is not far off when certificates granted by this representative body—endorsed as it has been by many of the large medical associations of the country, and enjoying the moral and financial support of the Carnegie Foundation—will be accepted by the various State Boards as ample evidence of qualification for licensure. Certainly the need is very great of a standard license in medicine acceptable in any part of the territory of the United States; and it is earnestly hoped that this volunteer "National Board of Medical Examiners" will soon be replaced by an official National Board, or its equivalent.—W. M. B.

SIR VICTOR HORSLEY.

The daily press brings the sad news that Sir Victor Horsley, one of Britain's great surgeons, recently died of heat stroke in Mesopotamia, where he was on duty as Colonel in the Royal Army Medical Corps.

Horsley's name is linked with those of Krause, Cushing and a few other bold pioneers and brilliant investigators who have developed the modern surgery of the brain and spinal cord, and his fame will rest securely on his important contributions, both clinical and technical, to this difficult and complicated branch of surgery.

*Further information and application blanks may be obtained from Dr. J. S. Rodman, secretary of the board, 2106 Walnut Street, Philadelphia, Pa.

Surgical Suggestions

A "fistula in ano" opening in the midline in front of the anus should suggest its possible origin from a perineal dermoid cyst.

In distinguishing between subphrenic and hepatic abscess, marked enlargement of the liver downward suggests that the abscess is in the viscus. Subphrenic abscess accommodates itself chiefly by pushing the diaphragm up.

In excising an angioma make the incision large enough and sufficiently far from the growth to permit approach to it from all sides and deliberate ligation of all the vessels feeding it.

Pituitrin (pituitary liquid) is a powerful and reliable stimulant of intestinal contraction. Its use may thus be actually life-saving in dealing with the sometimes threatening post-operative paralytic gut distention that will not respond to enemata or purges. The drug may be injected into the muscles or directly into a vein; and this may be repeated at intervals of a few hours, if necessary. Its action is almost instantaneous.

Surgical Sociology

Ira S. Wile, M. D., Department Editor.

STANDARD SURGICAL OUT-PATIENT CLINICS.

The value of cooperation in clinical work is indicated in the usefulness of the Associated Out-Patient Clinics of the City of New York. Their efforts to coordinate the work of existing dispensary and out-patient departments, to eliminate unworthy applicants for treatment, to promotion of proper standards of treatment, and to further all methods that make for economy and efficiency are most commendable.

In the process of standardizing clinical work, numerous plans have been suggested for specific types of clinics. While most of the advice developed through the investigation of the committees is applicable principally to the organization of clinics in large cities, there is a certain measure of applicability in any institution in any community.

With a view to spreading information with reference to the standards for surgical clinics, it is perhaps advisable to quote the report prepared by the section on surgery of this organization. The careful study by superintendents of dispensaries as well as the dispensary medical boards and surgeons in attendance will undoubtedly suggest many weaknesses in existent systems and stimulate and further the development of better service in surgical clinics.

I. EQUIPMENT OF A SURGICAL CLINIC.

1. Rooms:

The clinic should consist of two units, one for male and one for female patients, each unit to consist of the following:

A separate space for history taking.

One large room for examination of patients and general dressing.

If the number of patients warrant such arrangements—

One operating room for clean cases.

One operating room for infected cases.

One room for the treatment of fractures.

When the two units are in charge of one chief of clinic, one set of operating rooms can be omitted, and in place of these, one recovery room should provided.

Accommodations should be provided for keeping patients in bed for periods of from ten to twenty-four hours.

2. Assistants:

It is desirable that there shall be in attendance for each unit at least two doctors, besides the chief and the first assistant. When the two units are run together, this will give a total of at least six men.

There should be assigned to each unit one nurse to assist with dressings, and a third nurse should have charge of the operating rooms.

3. Laboratory Facilities:

Should be available for the complete anatomical, pathological and chemical examination of excreta, secreta, tissues, etc.

It is recommended that a complete department of this kind be established for the benefit of the entire dispensary and placed in charge of a competent laboratory man.

Provisions for the simpler tests for examination of urine and blood should be available in the dispensary rooms.

4. X-ray Facilities:

Both for photographic and fluoroscopic work.

When the dispensary is connected with a well-equipped hospital, use could be made of the X-ray plant of the hospital but facilities for fluoroscopic work should be at hand in the dispensary rooms

in cases in which the X-ray plant is not in close proximity. Facilities for photography should also be present.

5. Facilities for:

Mechano-therapeutics, hot-air treatment and electrical treatment and massage should be available in a separate department.

II. THE KIND OF PATIENTS TO BE TREATED IN A SURGICAL OUT-PATIENT DEPARTMENT.

1. The decision as to whether a case is an out-patient or not should be rendered by the chief of the clinic.

A. Anesthesia:

1. In all cases where possible, local anesthesia shall be used.

2. All cases for anesthesia must first be referred to the surgeon in charge for his examination, or, in his absence, to the first assistant. In all cases in which general anesthesia is used, a suitable recovery room must be provided, and the patient must have the services of a nurse until out of the influence of the anesthetic.

B. Fractures:

1. Ambulatory fracture cases may be treated in the out-patient department, provided open operation is not necessary.

2. The service of a radiographic department to furnish sufficient skiagraphs for the treatment of fractures should be afforded to the out-patient clinic. This department should, if possible, be in close proximity to the out-patient department, in order that fluoroscopic examination may be made, if deemed necessary.

3. There should be available material for splinting fractures, and in addition the services of a competent bracemaker should be secured in cases for which such services may be necessary.

4. There should be, either in connection with the out-patient department or connected with the hospital, and open to patients from the out-patient department, a department of massage, mechano-therapy, hydrotherapy, and hot-air treatment for the treatment of convalescent cases.

C. Operative Cases:

1. The permission of the surgeon in charge, or, in his absence, that of the surgeon designated by him, must be obtained in every operative case.

2. Lumbar puncture for diagnosis and the injection of salvarsan should be performed only in clinics in which facilities are provided for keeping patients in bed for at least twenty-four hours.

3. In those clinics in which the Laryngological Department is under the control of the Surgical Department, tonsils and adenoid cases shall not be operated upon except under general anesthesia, and unless facilities are provided for keeping patients under observation in bed for at least twenty-four hours.

4. Patients that have been operated upon should be visited when necessary, by the visiting nurse, and her records and report attached at once to the history of the patient. An immediate report should be made by the visiting nurse to the operator personally or by telephone, should the nurse, in her judgment, consider it necessary that the patient should be visited by a doctor from the out-patient department, or admitted to the hospital.

III. SOCIAL SERVICE AND VISITING NURSING.

It is desirable that one or more Social Service Workers be connected with the Surgical Department.

Social Service should include:

1. Inquiry into the home conditions of patients.

2. Giving advice on the hygiene of the home.

3. Inquiry into workroom and occupational condition.

4. Elimination of unworthy patients from the clinic.

5. Referring families to relief agencies for studied constructive work, and rendering financial aid in emergencies, especially due to crippled wage-earners.

6. Following up cases recommended for hospital care, urging that such recommendation be observed:

a. Following up cases that require further treatment and return at proper intervals.

b. Following up ambulatory operative cases.

7. Rehabilitation of individuals or families whose need for assistance is in some way due to accident or disease.

8. Enabling patients to obtain mechanical appliances ordered by the doctor, and employment for the handicapped.

9. Visits by nurses to carry out such treatment as shall be designated by the doctor in the out-patient department. The nurse or social worker should be able to call on specifically designated

physicians of the out-patient department who shall be known as Out-Patient Visiting Surgeons, for consultation.

It is well at the outset to state that in out-patient clinics affiliated with hospitals there should be one department for keeping the records of all the patients of the hospital. This department should have a record room equipped with filing cabinets and whatever other accessories may be necessary, and should be in charge of a competent stenographer.

On application to the out-patient department every new patient (and the clerk should be instructed to ascertain carefully whether this patient has ever been treated in any department of the hospital previously) should be given a history sheet stamped with a serial number in order of application, thus making the history sheets more or less in chronological order with reference to the admission of the cases. These histories shall be placed in an envelope marked in different languages, that the envelope and its contents shall not be taken home, nor read nor folded. The patient shall also receive a card, which should always be brought by the patient to the hospital when he comes, bearing his name, age, address, the date first received, the history number, the hours when he is expected to come, and on its back the words "Penalty for False Representation." This card should also be delivered for the patient's keeping in an envelope with instruction not to lose it, and the statement that a fee of ten cents will be charged for the issue of a new card. The record clerk shall also make out a name-filing card along stated lines.

Return patients are given their histories on presentation of their cards at the window. If a patient is referred to another department his history and name file card are so stamped. The same history is used in all departments. No histories shall be removed from the files for other purposes, unless special permission is granted by the proper authority, etc., etc.

Book Reviews

Gynecology. By WILLIAM P. GRAVES, A.B., M.D., F.A.C.S., Professor of Gynecology at Harvard Medical School; Surgeon-in-Chief to the Free Hospital for Women, Brookline; Consulting Physician to the Boston Lying-in Hospital. Octavo; 770 pages; 424 illustrations. Philadelphia and London: W. B. SAUNDERS COMPANY, 1916. $7.00, net.

This work is designed both as a text-book and as a general reference book of gynecology. In both designs the author has been eminently successful. In no single volume on gynecology so far published in English has there been such a happy union of the essentials of a good text-book.

The author has happily divided his subject matter under three divisions.

Part I deals with the physiology of the pelvic organs and with the relationship of gynecology to the general organism. This is a distinct advance and must be of great value to gynecologists who treat patients as such, with regard to disease or pathology of organs remote from the pelvis with which however they are to be considered in relation to cause and effect. The facts of importance in this connection are well chosen and arranged and are in accordance with the latest teaching in gynecologic physiology and pathology.

Part II is concerned with a description of the various gynecologic diseases with which the student should be familiarized. Completeness of this part is favored by numerous excellent drawings from microscopic and gross specimens. These are essentially illustrative and are strikingly true.

There is only one thing lacking in this volume to make it complete as a reference book; that is fuller reference to works of other authors with acknowledgment in each case for important advances in clinical observation, in physiology and in pathology. While such references are, to be sure, somewhat cumbersome, their inclusion is a duty which is more or less overlooked by American authors. It is to be hoped that in the next edition of this volume, which is certain to appear in the near future, instead of expressing general indebtedness in the preface, the author will make acknowledgment to the excellent single contributions in medical literature from which he must have drawn his material.

The work is well illustrated, with 303 half-tone and pen drawings by the author and with microscope drawings by Margaret Concree and Ruth Huestis.

The International Medical Annual, *a Year Book of Treatment and Practitioner's Index,* 1916. Thirty-fourth year, New York: WILLIAM WOOD AND COMPANY. $4.00, net.

The present Medical Annual is the work of twenty-seven contributors, three of whom are Americans. These are E. Wyllys Andrews of Chicago; Lewis A. Conner and J. Ramsay Hunt, both of New York.

The book covers the entire field of medicine, as in previous years, and does it admirably this year, thanks to the increased zeal and energy of the contributors, who have tried to condense the advances in medicine and surgery into one compact volume so the professional men who are engaged in the various theatres of war may find in it ready and helpful reference. A special section has been added to the Dictionary of New Treatment on Naval and Military surgery. A great and, it may be well said, a successful effort has been made to embody in this book all information the authors have been able to gather that would serve to make the health of the soldier more secure. The methods that have been tried and found useful in dealing with military and naval surgery and medicine have been collected for ready reference by military and naval surgeons engaged in active service who are otherwise out of touch with the ordinary channels of communication which they enjoy in normal times.

While this is the special feature of this year's Annual there are few subjects in medicine or surgery the advances in which have not been included.

Lateral Curvature of the Spine and Round Shoulders. By ROBERT W. LOVETT, M.D., Boston; John B. and Buckminster Brown, Professor of Orthopedic Surgery, Harvard Medical School; Surgeon to the Children's Hospital, Boston; Surgeon-in-Chief to the Massachusetts Hospital School, Canton; Consulting Orthopedic Surgeon to the Boston Dispensary, etc., etc. *Third Edition;* Revised and Enlarged. Octavo; 213 pages; 180 illustrations. Philadelphia: P. BLAKISTON'S SON & Co. $1.75 net.

In this revised edition Lovett gives ample space to the

discussion of the treatment of scoliosis by forcible correction. The method of forcible over-correction as advocated by Abbott, arousing as it did so much attention in the past few years, is gone into fully. Lovett has come to the conclusion that this method must fail of permanent good results because it is in conflict with our knowledge of the pathology of this peculiar affection of the spine. The results in the treatment of scoliosis as previously reported by him seem now to compare so favorably with those of other advocated methods that Lovett has fallen back on his own personal experience. The book contains excellent illustrations of various phases of the disease as occurring in his own practice, including a number of roentgenograms, the great value of which receives special emphasis. A chapter on the history of scoliosis has been added in this revised edition. This, according to the author, has been incorporated because "there seemed to be nothing in English on the subject." The little book is without doubt the most complete and most up to date monograph on scoliosis contributed to English medical literature.

Traité de Gynécologie. Par FORGUE ET MASSABUAU, professeurs à la Faculté de médecine de Montpellier. Octavo; 928 pages; 283 illustrations. Paris: J. B. BAILLIÈRE ET FILS, 1916. 25 francs.

This volume is published as part of "Traité de Chirurgie," issued under the direction of Professors A. Le Dentu and Pierre Delbet. The two collaborators have succeeded in collecting the data essential in a complete work on gynecology. Without any preface or introduction the book begins with methods in gynecological examination. It then takes up each genital organ from the external to the internal and details diseases in categorical fashion in the accepted style of most text-books.

While making a massive reference book it is not exactly up to date. We note an absence of practically all the advances in gynecologic pathology and surgery that have been made in the past four years. References to medical literature still limit themselves to the year 1912. As a record of our knowledge in this special branch of surgery and medicine till 1912 the book may be said to be very complete, well illustrated and well worthy of a place as a reference.

The Kinetic Drive: Its Phenomena and Control. By GEORGE W. CRILE, M.D., Professor of Surgery, Western Reserve University; Visiting Surgeon to the Lakeside Hospital, Cleveland. Octavo; 71 pages; illustrated. Philadelphia and London: W. B. SAUNDERS COMPANY, 1916.

This little book contains the Wesley M. Carpenter Lecture delivered by Dr. Crile before the New York Academy of Medicine in 1915. It sets forth briefly Crile's views as to a mechanistic conception of life in the study of both normal and pathologic processes; "and it suggests a philosophy of life by means of which self-preservation may be secured through kinetic control."

Though one may not fully agree with the various views set forth by the author, one cannot but admire his clever exposition of the subject and the interesting manner in which emotions and disease are shown to be related. The book is illustrated with several excellent photomicrographs.

Diseases of the Skin. By RICHARD L. SUTTON, M.D., Professor of Diseases of the Skin, University of Kansas School of Medicine; former Chairman of the Dermatological Section of the American Medical Association, etc., etc. Octavo; 916 pages; 693 illustrations and eight colored plates. St. Louis: C. V. MOSBY COMPANY, 1916.

The student and practitioner will find in this book a most excellent and comprehensive treatment of the subject of dermatology. No efforts have been spared to make the book attractive as well as useful, and the profusion of photographic reproductions is remarkable. The various diseases of the skin are treated in concise manner, special emphasis being laid on pathology and therapy. Following the description of each disease will be found a list of the most important references concerning it in the English, French and German literatures. Besides the skin itself, the author takes up separately lesions of the hair, nails, sebaceous and sweat glands, and the mucous membranes adjoining the skin. Excellent pictures of many of the rare tropical diseases are presented.

Altogether the work may be highly recommended as a well written comprehensive text-book of dermatology.

The Catarrhal and Suppurative Diseases of the Accessory Sinuses of the Nose. By ROSS HALL SKILLERN, M.D., Professor of Laryngology, Medico-Chirurgical College; Laryngologist to the Rush Hospital, Philadelphia, etc. *Second Edition.* Octavo; 417 pages; 287 illustrations. Philadelphia and London: J. B. LIPPINCOTT Co., 1916. $5.00.

This is a thorough and logical handling of a most difficult subject, entirely from the viewpoint of the practitioner.

The first part of the book, under the heading of "General Considerations," deals with the surgical anatomy and the physiology of the sinuses and the pathology of accessory sinus disease, together with its sequelæ and complications. The methods of making an examination and of reaching a diagnosis are gone into in detail.

The subsequent chapters take up the individual sinuses more completely and go over much of the ground covered in the "General Considerations." This makes for repetition; but, as the author states in his preface, it tends to impress important facts upon the reader.

Altogether it is an excellent work both for the general practitioner and for the specialist.

Progress in Surgery

A Résumé of Recent Literature.

The Significance of Syphilis in Obstetrics. WM. D. FULLERTON, *American Journal of Obstetrics.* July, 1916.

The suggestions for minimizing the effects of syphilis from an obstetrical viewpoint are given by the author as a summary of his experience and conclusions. All physicians practising obstetrics should in his opinion become familiar with the signs and symptoms of syphilis in the placenta, fetus, and young children, as well as with the suggestive histories of the parents of such children. The history of every pregnant woman should be taken as early as possible in her pregnancy, and special emphasis should be laid on her past history relative to evidence of infection, such as genital sore, rash, sore throat, abortions, miscarriage, premature labor or the birth of children dying in early childhood or living with evidence of the disease. Whenever infection is in the least suspected, the patient should be carefully examined for evidence of the disease and a Wassermann test made. In such cases the husband should also be examined, and if found infected, he should be treated.

Every new-born child should be examined and watched for evidence of infection. Every placenta should be weighed, examined microscopically, and at least a freshly tested specimen examined microscopically for evidence of the disease.

Especially in all obstetrical clinics, including both hospital and out-door services, the same precautions should be taken, and the careful examination of every placenta, both fresh and sectioned, should be a part of the routine laboratory work. Special staining for the treponema should be done whenever infection is strongly suspected, and thorough autopsies, whenever available, would be most instructive.

Every patient showing evidence of the disease either before or after labor, should be impressed with the importance of continued treatment. Charity cases should be referred to a free dispensary for treatment, and if they

do not report regularly the visiting nurse or social service workers should exert their influence, enforced if necessary by civil authority, to compel these patients to take treatment.

Report of a Case of Carcinoma Uteri Treated According to the Percy Method, with Autopsy Findings. FREDERICK W. BANCROFT, *American Journal of Obstetrics*, July, 1916.

The findings in Bancroft's interesting case as summarized by him are as follows: Certain islands of cancer cells show advanced degenerative changes, reaching in many instances stages of necrosis and dissolution. Other show milder grades of degeneration, and still others have apparently not been affected by the treatment. The latter cells have all the appearance of viable carcinomatous structures, but concerning the ultimate fate of even these well-preserved cells he does not wish to commit himself. The author also calls attention to the fact that the Percy operation is attended by a mortality in a certain percentage of cases. The author's patient died with symptoms of a severe toxemia similar to that as reported from radium treatment of cancer of the womb.

Acidosis Complicating Pregnancy, with Report of a Case Cured by Transfusion. ALBERT H. ELY and EDWARD LINDEMAN, *American Journal of Obstetrics*, July, 1916.

The authors report a case of repeated severe vomiting by a woman in her second pregnancy, with acetone and diacetic acid as constant findings in the urinalysis. The successful treatment of this serious condition was brought about by transfusion with the syringe method. The rather novel and ingenious plan of administering alkalies in large amount to the donor twenty-four hours before the transfusion, was carried out. 1100 c.c. of blood with 300 c.c. of Lock's solution were poured into the recipient's circulation. According to the author's expression of opinion the result was "miraculous"; the patient made a remarkable recovery.

[There are a number of points in the report about which questions must be raised. The reader who is interested should see the original article before trying the procedure in his own cases.]

A Report of Three Cases of Labor Following Ventral suspension. WM. E. CALDWELL, *American Journal of Obstetrics*, July, 1916.

Caldwell believes there should be no deliberate fixation in the child-bearing woman without sterilization. The three cases reported by him are illustrative of some of the serious after-effects both as to disturbance in functions and, worse still, danger to life of the patient in the event of future pregnancies that go to term. The three cases reported by him ended in death, due to rupture of the uterus in one case, severe infection in another, and in the third to adhesions binding the sigmoid and intestinal coils to the abdominal wall.

The Etiology of Uterine Prolapse and Cystocele. GIBBON FITZGIBBON, Dublin, *Surgery, Gynecology and Obstetrics.*

Fitzgibbon gives a detailed description of the pelvic fascia as it leaves the abdominal parietes at the white line marking the rami of the pubes to form a sling to support the pelvic viscera, chiefly the bladder and the uterus. The "endopelvic" fascia he claims is the true supporting membrane of these two organs. Prolapse of the uterus and cystocele are due to damage of the pelvic fascia in the region of the lateral fornices and in front of the cervix. Prolapse of the uterus may, however, exist without the presence of a cystocele. According to the author's theory, laceration of the perineum and levator ani muscles cannot be responsible for the production of prolapse. When there is the primary defect, it allows for an increase of the cystocele. Prolapse and cystocele are analogous to abdominal hernias through scars, due to defective union of the fascia. The cure of the condition can therefore be effected by reuniting the fascial diaphragm across the pelvis. This can be repaired without interfering with the function of the uterus or dislocating the bladder. Atrophy of the uterus has no influence upon its support; hence amputation of the cervix other than the removal of an hypertrophied lacerated vaginal portion is not necessary.

Subluxation of Radial Head. C. A. STONE, St. Louis, *Journal of the American Medical Association*, July 1, 1916.

Stone reports a case of subluxation of the head of the left radius in a child while being pulled across the floor in play. Flexion of the forearm was painful and supination was especially so, but in one of the attempts the dislocation was reduced suddenly and motion was free and painless. The following summer the subluxation recurred in the right elbow, but ceased in the same way. It occurred still again on the left side in May, 1915, and ended similarly. In going over the clinical records available to him, for the past five years, Stone found no similar account of subluxation in over 14,000 surgical and orthopedic cases. Most of the accounts came from German and French surgeons, 400 cases having been reported prior to 1889. Van Arsdale reported 100 cases in that year and gave a complete bibliography. The causation and pathology are discussed and Stone reports his experiments in producing the dislocation on the anatomic material of the Washington University Medical School. In every instance the bones were practically free from muscles, but the ligaments were intact. While trying forcible traction on the first arm the annular ligament could be seen to spring inward, but on attempting powerful adduction, the external lateral ligament ruptured. Of the remaining eleven elbows a subluxation of the radial head was produced in six. In each of these six cases the annular ligament always slipped over the head when the hand was pronated. One case with the hand in this position resulted in failure. In the remaining four cases, the ligament tore during traction while the hand was supinated. Stone finds a slight difference in the diameter of the radial head from that given in the textbooks, where it is always described as round. The longest diameter is always in the same sagittal plane as the interior portion of the tuberosity of the radius. The explanation for the lesion occurring in the hand pronated is as follows: Anteriorly, from the neck of the radius to the head the rise is an abrupt one. Any traction with the hand supine pulls the ligament against this. Laterally and posteriorly, the ascent is quite gradual, so that in pronation the ligament lies over this part and is stretched until it suddenly slips over the head. The conclusion is that subluxation of the head of the radius can occur while the biceps is contracted with the forearm flexed and without adduction, while the hand is pronated. Suppination is resisted because the tense lateral ligament forces the flattened side of the radial head against the anterior edge of the lesser sigmoid articulation and the inner attachment of the annual ligament. Attempts at this motion throw the exposed two-thirds of the long axis of the head against an already tight ligament, increasing the tension. Complete pronation is possible because the short part of the long axis is behind and moves outward against the loose posterior portion of the lateral ligament.

Fracture of the Os Calcis. BENJAMIN F. LOUNSBURY, *Surgery, Gynecology and Obstetrics*, June, 1916.

Fracture of the os calcis has occurred in 21 cases out of 1,000 cases in the author's experience, making the percentage 2.1. This he claims is far more frequent than is generally supposed. The reason for the former belief in the variety of this fracture was lack of routine roentgenography. Owing to the disability that results from fracture of the heel bone when overlooked and improperly treated, it is well in every case of so-called sprain of the angle or severe injury of the foot to *x*-ray the affected part. Frequently this fracture may be the underlying injury.

In tear fractures the author advises suture with kangaroo tendon followed by immobilization with relaxation of the muscles of the calf and the plantar fascia and muscles.

Tuberculosis of the Superior Maxilla. RAFAELE D'ALISE, *Annale di Odontologia*, February, 1916.

Reports two cases. Primary tuberculosis of the mouth is unusual, that of the superior maxilla being especially infrequent. Carious teeth and the trauma incidental to their extraction furnish the avenue of entrance for the tubercle bacilli.

In individuals predisposed to tuberculosis the resistance of the tissues is lowered by tooth decay and a favorable site for the infection is established.

Streptococcus Mucosus Capsulatus Infection of the Mastoid Bone. ROBERT L. LOUGHRAN, New York. *The Laryngoscope*, June, 1916.

After a short résumé of some of the literature covering the bacteriology of the organism the author reports three cases of mastoiditis in which streptococcus mucosus capsulatus was the infecting agent.

He calls attention to the extreme virulence of the organism and the marked destruction of tissue, both soft and bony, in the cases in which it is found. The prognosis is always grave inasmuch as the symptoms, in the beginning may be insignificant though there is already extensive involvement of important structures. There is—the author quotes Whiting—the development of a most dangerous and insidious latent period which may justly occasion apprehension concerning the outcome of any inflammatory ear disease which has its origin in the activities of this infective agent.

Sarcoma of the Scapula; Histological Diagnosis Made by a Study of Blood Aspirated from Pulsating Portion of the Tumor. C. E. ROYCE, *Surgery, Gynecology and Obstetrics*, July, 1916.

About 10 c.c. of blood withdrawn from a pulsating tumor of the scapula, clinically diagnosed as sarcoma, were permitted to stand overnight at room temperature, Formalin 10% was added to the clotted blood. The following day a portion of the clot was removed and imbedded in paraffin and examined. Sections of this stained with hematoxylin-eosin revealed beautiful pictures of islands of sarcoma cells imbedded in a matrix of fibrin and red cells. The cells were of the small round variety showing numerous mitotic figures.

Disinfection of Septic Joints. F. J. COTTON, Boston. *Boston Medical and Surgical Journal*, June 1, 1916.

Cotton believes that the knee joint has a far greater resistance against infection than is generally believed. He holds that drainage of the joint for any purpose is almost a crime. Patients upon whom this procedure is practiced do badly, not because of the sepsis arising from the joint, but from infection in the muscle and fascia planes in the thigh. Cotton has obtained splendid results in septic joints from thorough washing out of the joint through an incision with 1-15,000 bichloride solution, followed by salt solution and *tight closure* of the joint. Cotton reports seven cases.

Gas Gangrene in the Present War. M. WEINBERG, Paris. *The Glasgow Medical Journal*, April, 1916.

The author, who had been deputed by the Pasteur Institute to make a study of gas infections, gives the results of his researches. Gas gangrene is a usually rapidly fatal infection. It is caused by a number of different organisms, among which bac. perfringens is the most common. The gangrene of the limb is not a necessary feature of gas infection. In such cases numerous wide incisions of the wound area may save the patient's life. The gangrene is probably due to shutting off the blood supply, either by severing of the arteries or by thromboses. In cases where gangrene has occurred the organisms forming gas seem to thrive especially well, hence the resulting picture of gas and gangrene.

The flora of gas gangrene is the same as that of almost every wound, and on the other hand, a wound may become, sooner or later, sometimes even a very long time afterwards, the starting point of a grave gaseous infection. It is, therefore, evident that every good treatment of wounds is a preventive treatment of gas gangrene. The wound, to be well treated, must be treated with the least possible delay. It must be laid open as widely as possible, foreign particles must be cut away and all fragments of bone must be removed. In the case of gangrene of a limb amputation is always necessary.

Sera and vaccines would appear to be beneficial, but they are extremely difficult to prepare.

Roentgen-Ray Diagnosis of Gas and Pus Infections as Complications of Wounds with Deeply Buried Bullets or Shell Fragments. GEORGE G. DAVIS, *Surgery, Gynecology and Obstetrics*, June, 1916.

It is a routine procedure at the Twenty-third General Hospital from which this report is made, to roentgen-ray all bullet or shell wounds when the missile is suspected of remaining within the body. The characteristic finding in the shadowgraph is a halo-like shadow encircling the bullet. This is due to an abscess cavity which in the majority of cases is a bacillus aerogenes capsulatus infection. In more extensive infections which undermine muscle planes there are radiating pale shadows going up and down and in all directions from the bullet halo. When this shadow is found it is taken as an urgent indication for operation.

The Action of Gamma Rays of Radium on Deep Seated Inoperable Cancers of the Pelvis. H. SCHMITZ, Chicago, *Medical Record*, July 15, 1916.

The therapeutic action of radium depends on the use of a correct technique, which must be based on a careful physical examination of the patient and the physical properties and the biologic action of the metal.

The use of massive Roentgen rays, according to multiple field and crossfire methods in conjunction with radium therapy to destroy metastases, is an imperative necessity.

Certain surgical procedures must be used in radium therapy to assist the action and facilitate the application of the rays.

The action of gamma-rays on cancer tissue is specific and suggests positive proof of the possibility of destroying malignant tumors by the application of radium.

The results of radium therapy in inoperable and recurrent cancers surpass those of any other known therapeutic agent.

The prophylactic use of radium rays in operable carcinomata increases the percentage of operability and probably the efficiency of the operative procedures.

Pelvic Varicocele. J. ALVARADO WALL, *Surgery, Gynecology and Obstetrics*, July, 1916.

The symptoms of pelvic varicocele are not well defined as a rule. Pain in the lumbar region and in the lower part of the abdomen, aggravated on standing, during and just before the menstrual period, subsiding when the patient lies down and when the flow is well established, without any other physical findings to account for it is very suggestive of a pelvic varicocele. When in addition there are varicosities in the lower extremities and in the labia together with the physical finding of a "swollen flaccid" mass in the cul-de-sac of Douglas the diagnosis may be made with fair amount of certainty. Care should be exercised when searching for the varicocele during operation to keep the patient flat, as the Trendelenburg posture tends to make the varicocele disappear. The condition is more frequent, according to Wall, than is commonly supposed.

Excision Versus Gastro-Enterostomy. *Van Buren Knott, Surgery, Gynecology and Obstetrics*, July, 1916.

In view of the fact that statistics from large clinics all point to the great frequency of cancer of the stomach developing upon an old ulcer basis, according to Knott in 70% of cases, the author urges that wherever feasible and possible the ulcer-bearing area should be excised by whatever method may be deemed most safe and practical. Gastro-enterostomy should supplement this operation in the event of a pylorectomy being necessary to get

rid of the extensive ulcer, or where adhesions are present and constriction is present or feared. Gastro-enterostomy alone cures about one-third of the cases, a second third of the cases have recurrence of symptoms while the last third develop cancer of the stomach within two to five years. This experience of Moynihan's is corroborated by Knott and should serve as a warning against doing the simple gastro-enterostomy for the permanent cure of ulcer of the stomach.

The Treatment of Exophthalmic Goiter (Basedow's or Graves' Disease). By Means of the Roentgen Rays. GEORGE E. PFAHLER and J. DONALD ZULICK, Philadelphia. *The Pennsylvania Medical Journal*, June, 1916.

After a very complete review of the literature of the subject, the authors point out that although many cases of exophthalmic goiter have been treated by Roentgen rays, conclusions as to the efficacy of the treatment are risky owing to the great variability in the technic employed.

The authors believe that the *x*-ray has a field of distinct usefulness in the treatment of this form of goiter. A preliminary roentgenogram of the chest should be made in all cases in order to obtain some information as to thymic size and as to substernal extension of the goiter. When the thymus is not found enlarged, a single dose directed through the sternum will be sufficient. When it is enlarged, the rays should be passed through two fields on either side of the median line below the clavicles, including the first, second and third spaces. The dosage must be carefully regulated so that the total amount given the patient is known. The series decided upon should not be repeated inside of three or four weeks. Sometimes it is advisable to divide the treatment so as to give a dose through only one or two fields at a time. After there is a distinct improvement in the symptoms, the interval should be prolonged, for there is danger of reducing the secretion of the gland to the extent of producing the symptoms of hypothyroidism.

The authors conclude their study as follows:

"We believe that the trial of treatment for one series with an interval of waiting of one month is justifiable in all cases, for if operation is decided upon nothing is lost, and many operations in this way can be avoided.

"Treatment should be directed toward both the thyroid and the thymus glands.

"An increase in weight and a decrease in pulse rate are the first signs of improvement and are practically always found.

"Treatment must not be prolonged over too great a period or hypothyroidism may be produced.

"The goiter and the exophthalmos are the last to show improvement, and in many cases show no change."

Observations in the Diagnosis and Treatment of Brain Injuries in Adults. WM. SHARPE, New York. *Journal American Medical Association*, May 13, 1916.

Sharpe notices the high mortality of brain injuries and their neglect in the general hospital on account of the recognized hopelessness of the condition. He combats the notion that brain injuries following fracture of the skull get along just as well without operation as with it. This, he holds, is true if the operation has been delayed until they reach the dangerous stage of medullary compression or even the later stage of medullary edema. An early operation is advisable not only as a means of saving life, but also to lessen the danger of post-traumatic conditions which are, he believes, due to the resulting unrelieved intracranial pressure prolonged over several weeks or more. During the past three years he has examined personally and treated 282 adult patients having one or more traumatic lesions of the brain. Of the 239 recent acute conditions, seventy-nine patients were operated on, and of the forty-three old chronic injuries, twenty required surgical treatment. He reviews the symptoms that guide the surgeon and the other treatment. It is in fractures of the base that there has been the greatest difference of opinion as regards operation, and until recently it has only been realized that the fracture itself is of less consequence. It is the resulting hemorrhage and edema that are the dangerous complications of basal fractures. Decompressive operations, therefore, are advisable. In his seventy-nine patients operated on he has been impressed by the absence of extradural and middle meningeal hemorrhage unassociated with subdural lesions, which he thinks is a more uncommon condition than our textbooks would lead us to believe. In the great majority of cases many of the important guiding or localizing symptoms are absent and in that case if there are any signs of increased pressure in the skull, early subtemporal decompression is advisable. It is rarely possible to observe the fundal signs of choked disc within six hours after the injury and the signs of shock often overshadow or prevent the signs of increased intracranial pressure. It is poor surgery to operate on patients in such shock that the pulse rate is greater than 120 and any operative procedure for the relief of pressure should be undertaken while the pulse rate is descending at 60 or below. If this fall does occur and the pulse rate begins to rise rapidly, he has yet to see a patient recover. Repeated lumbar punctures at times are of great value in lessening the intracranial pressure, but if the intracranial pressure is very high there is danger in this for fear of medullary choking in the foramen magnum, though not as great as in tumor cases. Changes in the reflexes are interesting in these cases according as to the side on which they occur. The Roentgen rays are of little importance in fractures of the skull. The fracture is really the unimportant factor and it may allow the escape of blood and fluid so as to lessen danger. In conditions of gunshot and stab wounds of the head, as in intraperitoneal wounds, if the subdural cavity has been entered, it is advisable to enlarge the opening in the vault and a subtemporal decompression is advisable if the pressure is high. Sharpe says that it was surprising to note the high percentage of post-traumatic conditions in the patients discharged as cured, and he believes that decompression would relieve many of them, or at least stop the progression. The most satisfactory operation for brain injuries is the subtemporal decompression, that is, the bone underlying the temporal muscle is rongeured away to a diameter of from 2 to 3 inches and the dura opened so that escape of subdural blood and cerebral spinal fluid may occur. All depressed fractures of the vault should be elevated and removed for fear of later complications.

Mayer's Solution. A Non-Caustic Hypochlorite DOUGLAS STEWART, New York: *New York Medical Journal*, July 15, 1916.

Mayer's solution may be termed officinally Liquor Magnesii hypochloriti, and was advocated as a cheap and useful antiseptic. Stewart confirms these contentions after a rather extensive use and suggests a simpler method of preparing the solution. Five parts of calx chlorinata, ten parts Epsom salts, and a heavy microscope slide are wrapped up in a single layer of gauze, dropped into a hundred parts of vinegar and allowed to stand an hour. One of the strong advantages of this solution is its deodorizing power, especially for smelling feet or septic vaginae. It is non-irritating to the skin.

Tubal Sterilization. ALFRED HEINEBERG, Philadelphia. *New York Medical Journal*, July 15, 1916.

Heineberg reports two cases of pregnancy despite a bilateral salpingectomy for inflammatory disease of the adnexa. Based upon his experience and a study of the literature, Heineberg offers the following conclusions:

1. There is no method of tubal sterilization which affords absolute security against conception.

2. Simple ligation of the Fallopian tubes with either single or double ligatures has been followed by the largest number of unreported failures.

3. Excision of a wedge-shaped section from each cornu of the uterus, followed by careful closure of the opening with musculomuscular seroserous sutures has yielded better results than any other method.

4. In the light of our present knowledge it seems unwise to advocate any other method than cornual resection.